STEEL

The

Metalworking Weekly

APRIL 11, 1960

A PENTON PUBLICATION

R. DAVID THOMAS JR.,
Upcoming president,
American Welding Society

Welding Fights Production Costs

BETTER WELDING processes can help metalworking managers get greater production efficiency . . . help offset the wage advantage of foreign competitors, maintains Dave Thomas, president of Arcos Corp., Philadelphia.

He advocates:

- Engineers should be more extensively educated in welding. The twofold aim: A better understanding of welding's potentialities and the development of better methods.
- Managers should search for foreign knowhow that can be adapted to our fabricating methods.
- Companies should ruthlessly weed out rigid inspection requirements that are no longer necessary. They only add to the cost of the job.

—Page 88

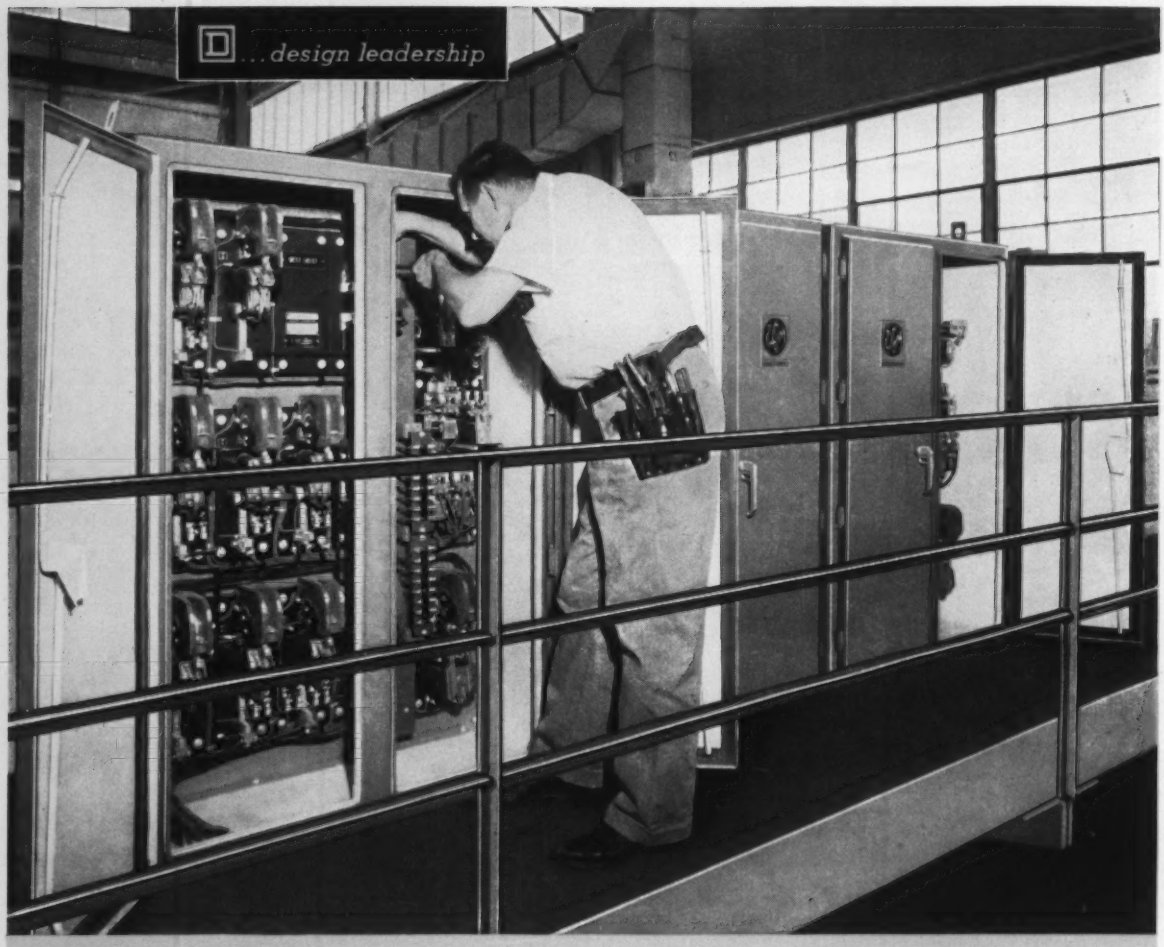
How Bargaining Trends Shape Up Following the Steel Settlement

Can the Whipsaw Pattern of Steel Inventory Cycles Be Flattened?

Electrical Machining Can Help You

Russians 'Rivet Weld' Structurals

CONTENTS—TURN PAGE



NEW! EC&M Front-Connected DC Control reduces catwalk width up to 20 inches

• When space is important, EC&M front-connected control can save you up to 20 inches of catwalk width. Moreover, the controllers are 10% to 15% lighter, can be backed up against girders. The result—a reduction in crane weight.

These new front-connected controllers provide the easiest maintenance of any available. All wiring and control components are accessible from the front, with ample working space inside the cabinet.

You get extra safety, too. Control components are mounted on insulated bases which in turn are mounted on panel studs projecting from the rear of the cabinet. The result is maximum insulation to ground.

EC&M front-connected control is available for single-motor DC drives up to 225 hp, with 2, 3 or 4 decks to suit headroom requirements. Includes exclusive Wright dynamic lowering circuit which gives maximum hook speed without danger of overspeeding.

Write for Bulletin 6121. Square D Company, EC&M Division, 4500 Lee Road, Cleveland 28, Ohio

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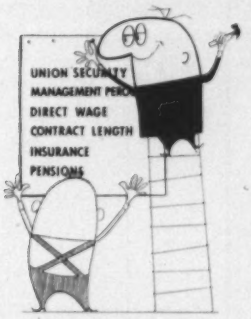
This Week in STEEL
The Metalworking Weekly

April 11, 1960 Vol. 146 No. 15

How Bargaining Trends Shape Up Now



Metalworkers are playing their collective bargaining cards closer to the chest since the basic steel contract was signed. A STEEL spot-check reveals these trends:

1. Direct wage increases average about 7 cents.
2. Increased insurance, health benefits still fall below the steel industry average.
3. Pressure mounts for longer vacations.
4. Long term contracts are sought.
5. Companies are taking a stronger stand on work standards.
6. Unions are not disposed to strike.

PAGE 53

Stampers Plot Sales, Price Gains

Stamping companies surveyed by STEEL are looking for sales to rise an average of 15 per cent this year, despite first quarter backlogs which stood at an average of 17 per cent below last year's level. Stampers unanimously expect price increases, geared to boosts in material costs. PAGE 58

Can Whipsaw Steel Inventory Cycles Be Flattened?

Market observers hope that the current easing in steel buying means some sensible flattening of the traditional peaks and valleys in steel inventory accumulation. Dampening wild swings in steel production requires excess capacity so that mill leadtimes are uniform, despite mild swings in consumption. PAGE 64

Russians 'Rivet Weld' Structurals

Soviet builders are joining structural members with a unique rivetlike deposit of weld metal. Fastening is relatively quick and eliminates drilling. You may have an application worth investigating. PAGE 100

Electrical Machining Can Help You

This new process of metal removal is bound to lift the operational ceilings of conventional machining.

You can use it to:

- Machine metal of any hardness.
- Machine without heat or cutting force.
- Machine dissimilar metals without tool loading.
- Machine without rotating or touching tool to workpiece.
- Machine odd shapes by plunging a static tool through the workpiece.

PAGE 104

Autodom Again No. 1 Steel Customer

The automotive industry was the leading customer for finished steel in 1959, regaining the position it last held in 1955. Service centers ended last year in the No. 2 spot, for a reversal of positions the two leading customers held in 1958. Here's where the steel went. PAGE 124

COMPLETE CONTENTS ▶

CONTENTS

Metalworking Week, Page 43

The Editor's Views—New Role for Maintenance! 49
How Bargaining Trends Shape Up Following the Steel Settlement .. 53
New Colors Are on the Way for Tinted Stainless Steel 54
$1 Trillion to Go for New Construction in 1960-70 55
Realistic Sales Training Pays Off—Ideas lead to orders 56
Stampers Plot Sales Gains—Revise earlier 1960 forecasts 58
U. S. Ponders Atomic Mining—Government urged to start tests 59
Once Bankrupt, Italy Booms—Great strides made since end of war 63
Are Inventory Practices Changing?—Industry hopes for flatter curves 64
Acme Steel Co. Plans Major Capital Spending 82

Technical Outlook, Page 87

Welding Show Section:
Welding Equipment Makers to Push Fight on Costs 88
Electron Beam a Hit—Makes steady progress in several fields ... 89
Welders See Uptrends in CO_2 Semiautomatic Processes This Year 90
Program, AWS 41st Annual Meeting and ASME Metals Engineering Division Conference at Los Angeles, Apr. 25-29 92
Russians Weld Rivets with Coated Electrodes 100
Hydrostatic Presses Form Shapes, Reform Properties 93
Progress in Steelmaking—Continuous Fluoroscoping Spots Pipe Weld Defects—Process uses x-ray and television equipment 96
Columbium Added to Steel Makes Pipe More Weldable 102
Expert Says: Electrical Machining Can Help You 104

Market Outlook, Page 123

Complete Index to Market News and Prices 123
Autodom Again No. 1 Steel Customer—Service centers drop to No. 2 124
Iron Ore Imports in 1959 Establish a Record 129
Steelworks Operation Chart and District Ingot Rates 132
Wider Price Spread on Import Steel Expected 132
Scrap Market Now Leveling Off—Prices holding on steel grades .. 144
Nonferrous Metals—Lead, Zinc Given Setback 148

WHERE TO FIND

Servicenter 5
Calendar of Meetings 10
Editorial & Business Staffs . 16
Metalworking Pulse 46
Windows of Washington .. 60
Mirrors of Motordom 69
The Business Trend 73
Men of Industry 77
Obituaries 80
New Products 107
New Literature 121
Advertising Index 153

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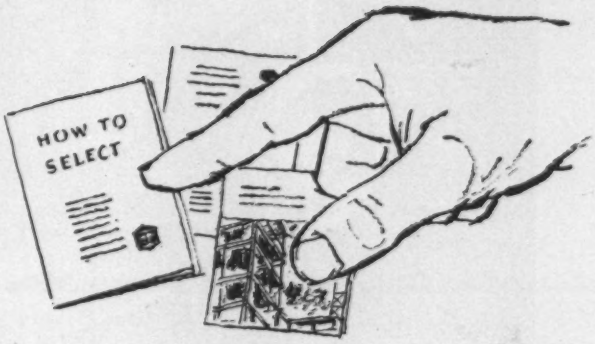
LET YOUR STEEL SERVICE CENTER GIVE YOU A HAND...

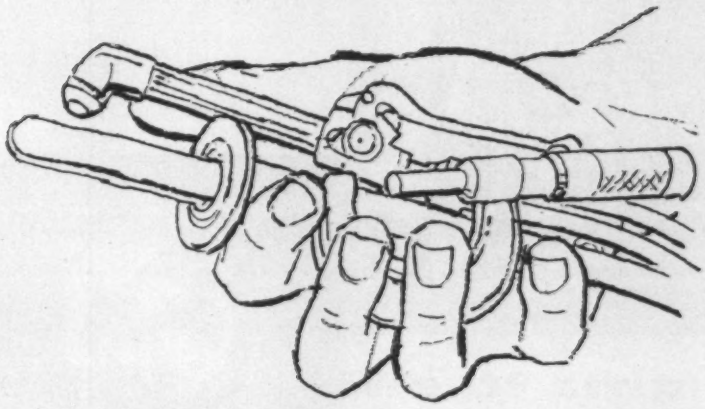


with Technical Assistance . . .

Whatever it is you want to know about selecting or fabricating steel, just ask your Steel Service Center. They work closely with steel producers on a great variety of problems.

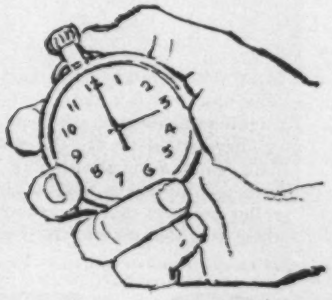
with Steel Inventory . . .

You can reduce your inventory costs, release tied-up capital, reclaim storage space when you use the large inventory of your Steel Service Center. Here you'll find ample stocks of Bethlehem plates, shapes, bars, sheets, tool steels, and alloy steels.



with Processing . . .

Your Steel Service Center will tailor your steel exactly to your needs. They are equipped for services such as flame-cutting, shearing, sawing, slitting, cutting, leveling, testing. You eliminate expensive handling equipment and labor.



with Meeting Production Schedules . . .

Quick delivery can be made by truck from most Steel Service Centers. And they'll set up delivery schedules to meet your production schedules. In emergencies, the steel you need can be rushed to the scene in a couple of hours.

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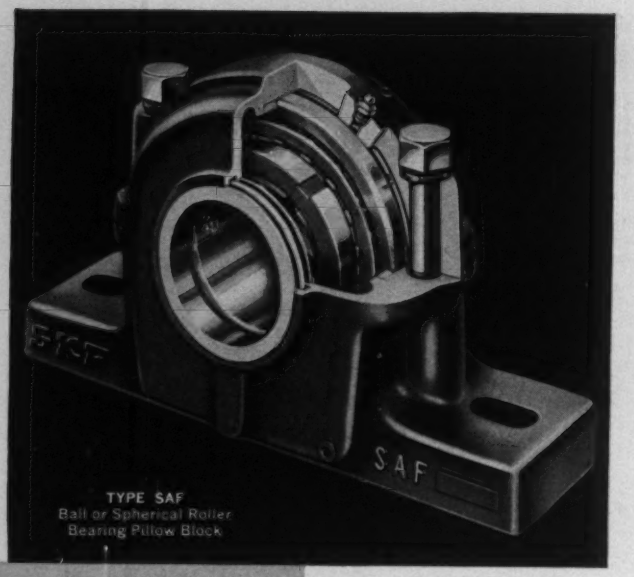
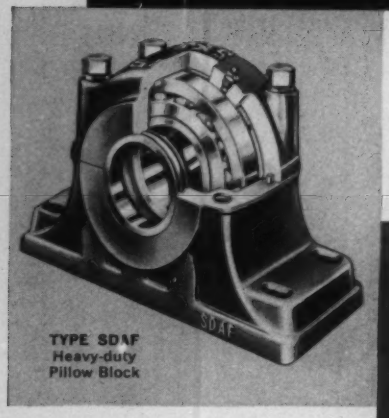
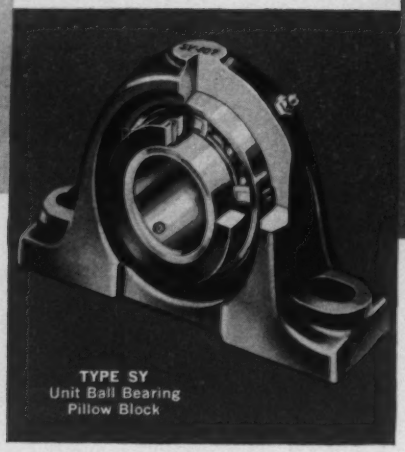


TYPE SAF
Ball or Spherical Roller
Bearing Pillow Block

Can you get these "special" qualities in "standard" pillow blocks?

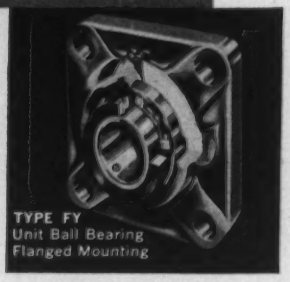


TYPE SDAF
Heavy-duty
Pillow Block



TYPE SY
Unit Ball Bearing
Pillow Block

TYPE SES
Unit Rubber-flex Ball
Bearing Pillow Block



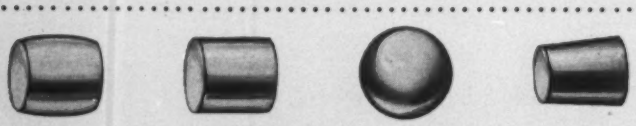
TYPE FY
Unit Ball Bearing
Flanged Mounting

Most pillow blocks offer easy assembly and rugged housings. But can they offer you low friction, self-aligning bearing operation and efficient sealing as well?

They can—if they're the SKF pillow blocks, and flanged mounting, shown here. Type SAF, for example, comes equipped with low-friction ball or spherical roller bearings that are *inherently* self aligning. And these bearings are effectively protected by Triple-Seal rotating rings. Abrasives and corrosives can't get to them—oil or grease can't drip out.

Yet this is a standard SKF pillow block, that is competitively priced in spite of its combination of extra features. We make it for shaft sizes from ¾" to 10½", for mounting directly or with an adapter. A cast steel housing (SAFS) is available for heavy duty applications.

For details, call one of our twenty-four offices. 5938



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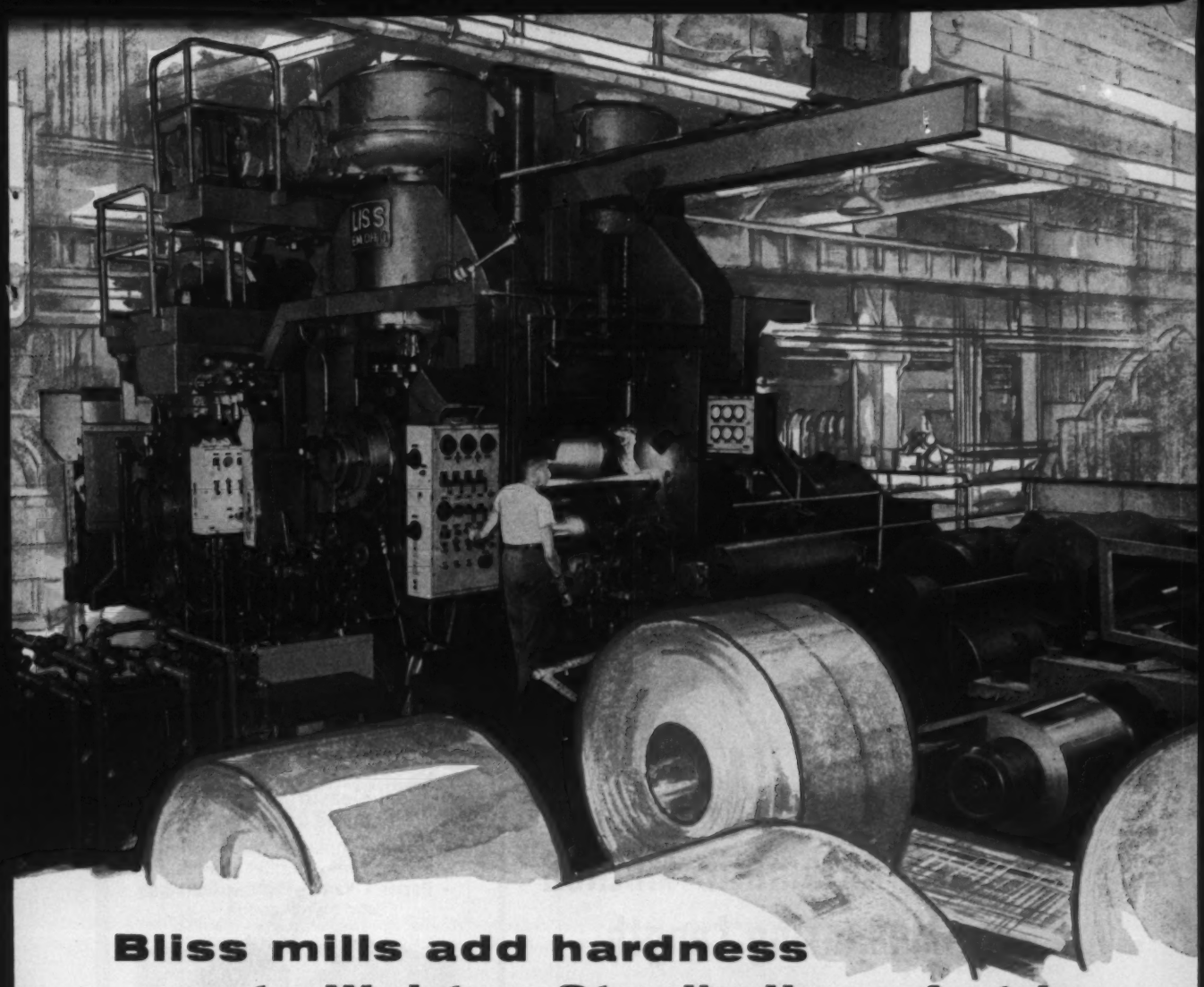


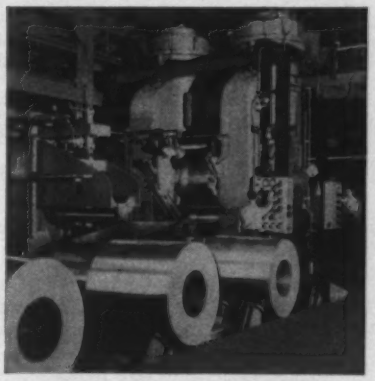
Bliss mills add hardness to Weirton Steel's line of strip

Weirton Steel Co., Division of National Steel Corp., the nation's largest independent producer of tin plate, uses a Bliss mill to achieve exacting temper and quality of its strip prior to plating. It is a four-high, two-high two stand tandem mill recently installed in its Weirton, W. Va., plant.

Through this unit Weirton has rolled a wide variety of steels in gages ranging from .00435 to .0147 inches and at an average maximum speed of 4,500 feet per minute. Well known products such as Weircote and Weirzin zinc coated steel are just two of Weirton's steel products to which this mill contributes.

A second Bliss mill tempers high-carbon, high-phosphorous, deep-drawing and galvanizing steels at the rate of 800 tons a day, while a new Bliss 48-inch slitting line is used to slit galvanized steel in gages from .0135 to .135 inches at speeds of 200 to 1,000 fpm. Both rolling mills are equipped with Amerigear-Bliss spindles.

These three installations provide one more example of the ready acceptance of the name of Bliss in the rolling mill industry—both here and abroad. To learn how Bliss equipment can help increase your rolling capacity, simply write for our new 84-page Rolling Mill Brochure, Catalog 40-B.



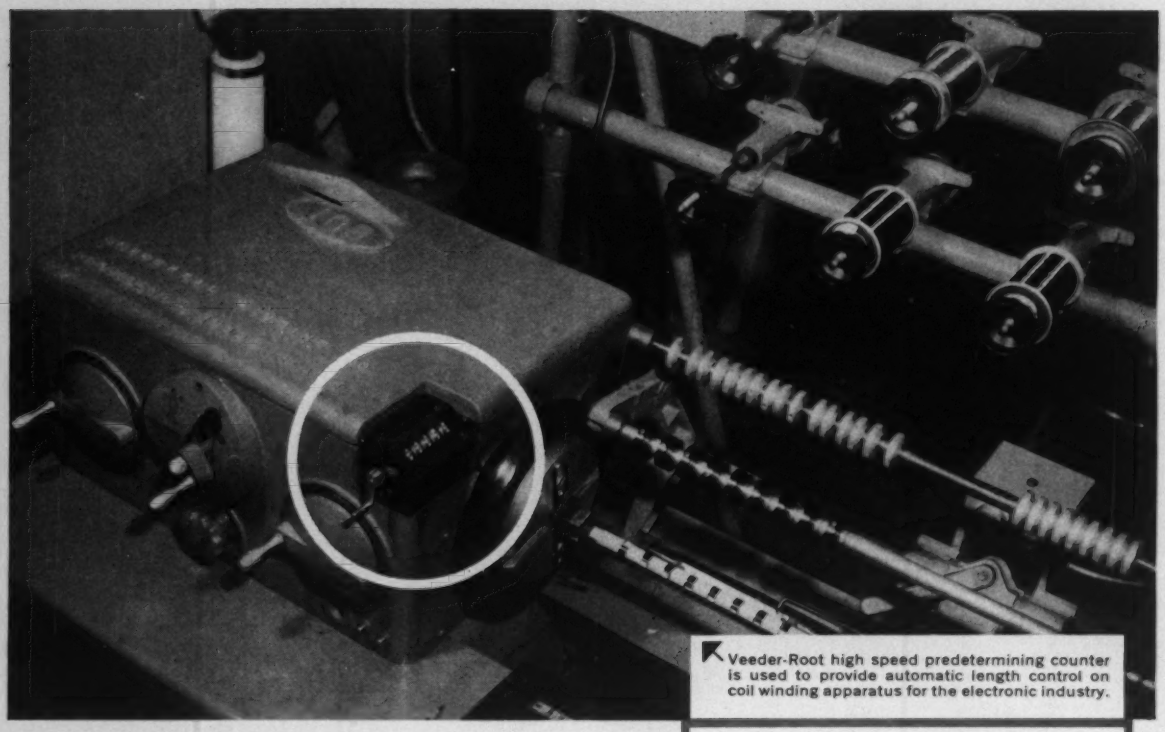
Four-high temper mill handles 30,000-lb. coils at speeds up to 3,500 fpm...has rolled 1,000 tons in a single day. Back-up rolls were supplied by Bliss' Mackintosh-Hemphill Division.

BLISS
SINCE 1857

Bliss is more than a name . . . it's a guarantee

E.W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio



Veeder-Root high speed predetermining counter is used to provide automatic length control on coil winding apparatus for the electronic industry.

Counters Provide Accurate, Automatic Method for Measuring Length

Accurate lineal measuring and recording can plug many of those hard-to-find loopholes in cost and production control.

The method . . . Veeder-Root Counters with modern on-the-spot indication, readout and automatic length control — stopping profit give-away from old-fashioned measuring!

- **Worm Driven Counters** . . . complete measuring unit using groove, plain faced, knurled or rubber faced friction wheels which revolve as material passes under them. Indication in yards, feet, meters or other units as required.
- **Count/Pak Measuring** . . . electric and electronic counters actuated by pulses through a photohead feeding into an electromagnetic counter. Ideal for non-contact measuring.
- **Mechanical Length Control** . . . predetermining counters actuate stop motions or signals when required lengths are reached. Control is automatic, measurement is exact.
- **Electronic Length Control** . . . high speed predetermining counters for non-contact measuring. Counters actuated by pulses through a photohead, easily engineered for special applications, 300,000 counts per minute and sequential stops of 10 or more can be provided.

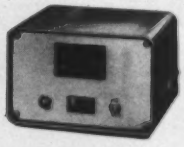
Let Veeder-Root help you control length — and cost!

A Veeder-Root engineer will gladly survey your needs and recommend the specific type of counting device for accurate lineal measuring; or standard counters are available through your local Veeder-Root Distributor. Call or write today for complete information.

Lineal Measuring Counters can be used for

• Metal • Thread • Wire • Braid
• Plastic Film • Rubber • Leather
• Paper • Yarn • Cloth • Tubing
and all roll goods

Quick reset, high speed predetermining counters.



Count/Pak electric and electronic counters.

Electric and electronic predetermining counters.

Lineal measuring (worm driven) counters.

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Please direct all correspondence to attention of Ed Service, STEEL, 1213 W. Third St., Cleveland 13, Ohio.

April 11, 1960

Birds, Roses, and Trends

You'll see a bird like this one orbiting through the pages of next week's STEEL. It will key the fourth in our series of Trends in Metals studies; this one is all about tool steels, which for some reason remind us of roses. Back in Gertrude Stein's day, one could say a rose is a rose is a rose and be pretty doggone sure a rose was a rose. One can't be as positive about tool steels. The term has become a misnomer. Rather than wait for development of exotic, new materials, manufacturers in the Space Age are taking advantage of tool steel properties and putting the metals to work in nontool applications. Example: M-50 tool steel is used for bearings and gears in advanced turbojet engines. It retains its hardness at temperatures above 700° F.

Maximum Effort

The editors will report on trends revealed in a survey of 3000 users; discuss tool and nontool applications (they may give you some Usership ideas); offer you some pointers on how to choose the type of tool steel that will give you the properties you seek; and cover some of the highlights and trends in the production of these tailormade materials.

All in all it's quite a useful package. Open it next week.

The Crux of the Problem

We hear from Thomas F. Muldoon, sales manager, Bridgeport Rolling Mills Co., Bridgeport, Conn.: "Your editorial and article in the Feb. 15 issue presented well the brass mill industry's struggle against imports.

"In the crux of the problem is the wide disparity in wages. We are practically defenseless in trying to meet competition. Our customers say: 'We are opposed to using foreign metal, but our competitors are using it and we cannot afford to lose our competitive position.' This is well and good, but the brass mill industry is a basic industry, and our nation cannot afford to jeopardize its security to pacify the proponents of free trade. In terms of national defense, the acceleration of imported copper and its alloys presents a frightening picture.

"With our Marshall Plan dollars, we helped finance the erection of foreign mills, furnished our foreign competitors with technical 'knowhow,' and equipment which we find difficult to buy due to our antiquated tax depreciation laws.

"The Copper & Brass Research Association is actively seeking the support of our legislators in Washington, but outside of a relatively few men, a general air of complacency prevails.

"The brass mill industry could have employed an additional 120,000 workers in 1959 if it hadn't been for imports . . . What is the loss in terms of unemployment, taxes, and disposable income available for retail sales? Is the popularity of small cars due to a genuine desire for economy on the part of consumers or is it due to the economic inability to pay the price of larger models?"

Pinpointing the Problem

G. M. Dorland, executive vice president, Nashville Bridge Co., Nashville, Tenn., requests: "Please send me four copies of 'How to Sell It to the Boss,' the fifth article in your Program for Management. It clearly expresses what I would like to have our plant managers do in presenting their equipment requirements for approval. Your series is most helpful and pinpoints the problem of today's management with a remarkable degree of accuracy."

Editor's Note: So far, more than 300 readers have requested complete sets of the articles. At least 75 others have requested copies, more information, or made comments. Sorry, but we don't have space to run all of their letters.

May Flowers in April

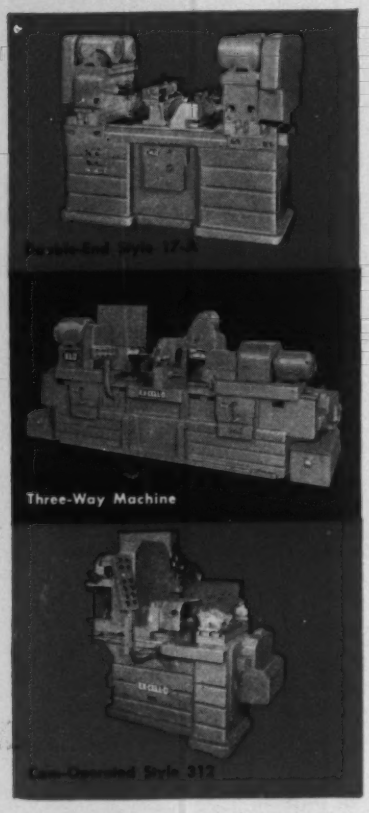
We're reversing the "April showers . . . May flowers" theme to present as refreshing a bouquet as we've received in years. R. J. Mosher, superintendent and vice president, Acme Die Casting Corp., Racine, Wis., writes: "I have been regularly posting STEEL's articles on our company bulletin boards to keep our employees informed about economic trends, their stake in the economy as affected by the employee-employer relationship, and to familiarize them with the pros and cons of unionization.

"More than 18 months ago, a union organized a nearby competitor. Last summer, the same union made a vigorous pitch to organize our

INSTRUMENT PARTS OR HEAVY CASTINGS, SHORT RUNS OR MILLION-LOT ORDERS . . .

AN EX-CELL-O PRECISION BORING MACHINE FOR EVERY NEED

Ex-Cell-O Precision Boring Machines do more jobs, more accurately—Rough, semi-finish and finish Boring • Facing • Turning • Chamfering • Grooving • Taper-boring • Gun-drilling • Contouring



Three-Way Machine

The Ex-Cell-O Catalog lists a wide range of standard Precision Boring Machines that meet your requirements for accuracy, speed, economy and dependability. Or call your local Ex-Cell-O Representative for details on hydraulic-actuated or cam-operated boring machines, single or double-bridge, horizontal or vertical styles, way-type machines and others in the complete line.

XLO EX-CELL-O FOR PRECISION

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN 59-40

plant. It did not succeed. I feel reasonably sure that I owe a generous thanks to STEEL for aid in making my people aware of the economic facts in the U. S.

"I discussed the program with several other manufacturers and they indicated considerable interest in a program of this type for themselves."

Squaring Away the Schedules

Mr. Mosher's letter just misses qualifying as an entry in our Usership Idea of the Month contest. If he had posted articles from our February, March, or April issues, it would have made the grade. Just so no one gets confused, here are the schedules for the contests:

February contest—the deadline for entries was Apr. 1, 1960, so that one's closed.

March contest—the deadline is May 1, 1960, which gives you three weeks to go back and review the March issues for Usership ideas.

April contest—the deadline is June 1, 1960.

If you have those dates firmly in mind, let's move on to . . .

How You Can Win $1000

Just tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—April, 1960) to help you accomplish an important personal or company objective. Be as specific as you can. If, in the opinion of the judges, yours is the best idea submitted—**you will win $500.**

There's more . . . you will win an additional $500 if you furnish written proof that you were successful in accomplishing your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

You can enter as many times as you wish. Please identify your letters as Usership entries. They will be judged by a committee of STEEL editors. All letters become STEEL's property. Send them to me, Ed Service, Servicenter, STEEL, 1213 W. Third St., Cleveland 13, Ohio. Remember, deadline for the April contest is June 1, 1960. Circle the date.

New Tie-in for Metalworking

Prestressed concrete railroad ties are being tested over a quarter mile stretch of the Seaboard Air Line Railroad near Tampa, Fla.

We wonder if they use spikes.

RUGGED PRECISE ECONOMICAL

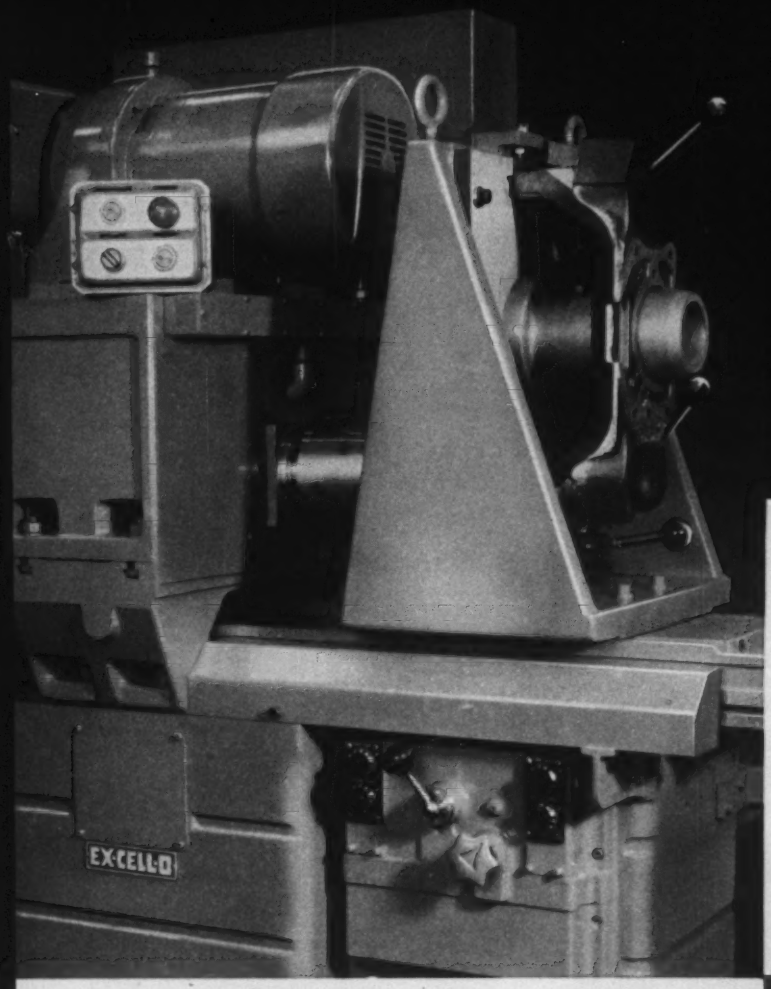
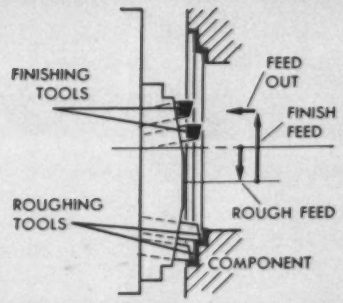
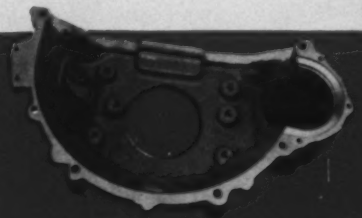


Table pad of the compact Style 2112-B provides ample space for this rugged fixture. Work is shown clamped in position.



Machining cycle and tooling are outlined above, with roughing tools shown fed to depth; finishing is done at opposite end of the feed stroke.



Starter motor mounting of this cast iron clutch housing is faced and bored from rough to finish in one cycle.

59-18

Ex-Cell-O Style 2112-B bores, faces heavy casting in a single cycle

RUGGED for roughing— PRECISE for finishing— ECONOMICAL for short runs

Precision built for boring, turning and facing small or medium-size parts, the Ex-Cell-O Style 2112-B Precision Boring Machine is equally adept at tackling a heavy cast iron truck clutch housing.

The job is done quickly and accurately in one cycle. After clamping, rapid traverse brings the work into position for roughing tools to face two shoulders and plunge two bores. Feed is reversed for finish facing, and table feed-out doubles as a finish-bore pass. A standard hydraulically-operated Ex-Cell-O Facing Head carries the tooling.

Find out how the Style 2112-B or the double-bridge Style 1212-B can put similar flexibility into *your* operation. Write direct, or ask your local Ex-Cell-O Representative about combining these rugged, time-tested Precision Boring Machines with low-cost tooling for real economy in long runs or limited production.

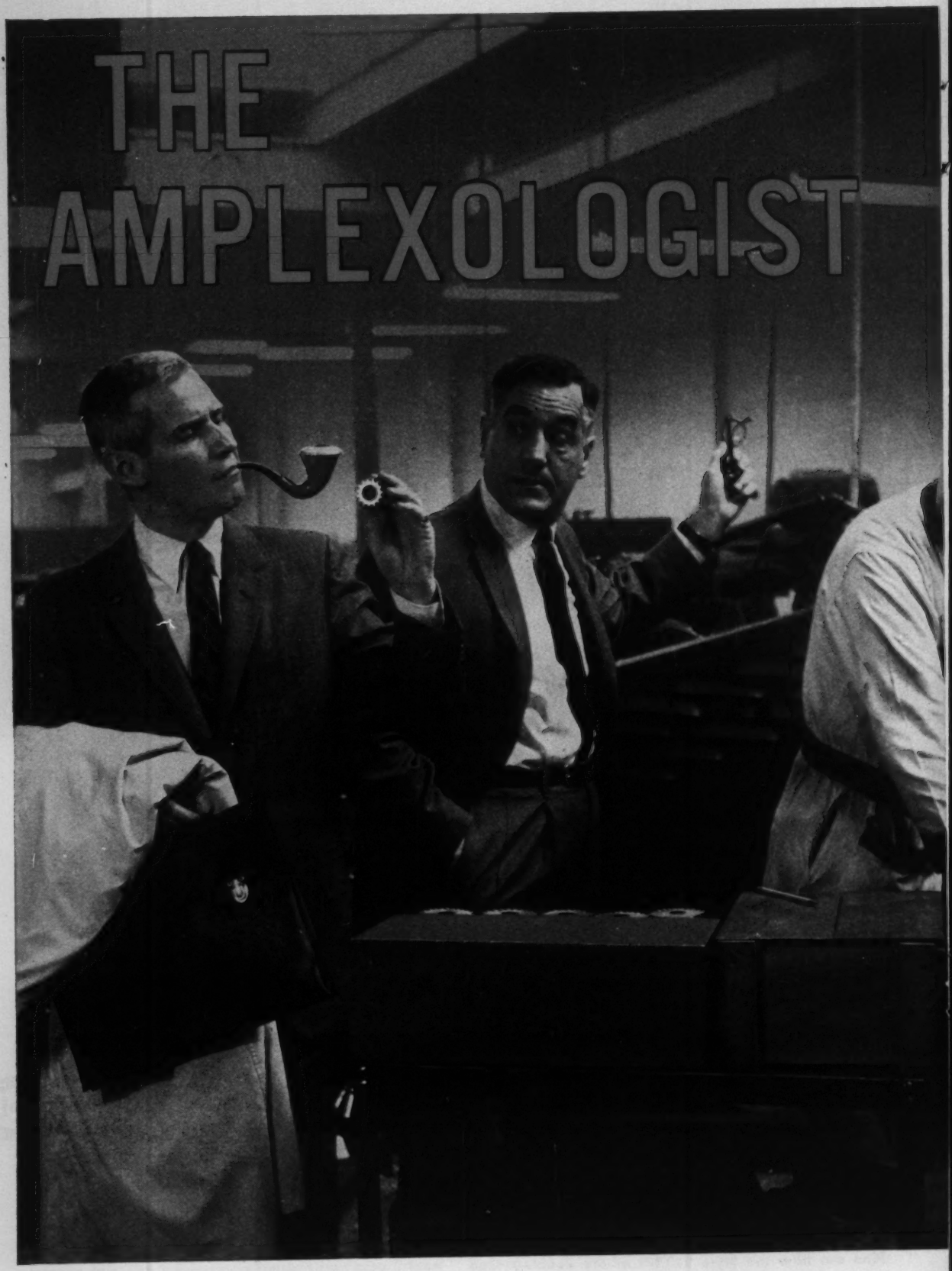
EX-CELL-O FOR PRECISION XLO

MMT-PE

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

Machinery Division

EX-CELL-O PRECISION PRODUCTS INCLUDE: MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • TORQUE ACTUATORS • THREAD AND GROOVE GAGES • GRANITE SURFACE PLATES • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT.


THE
AMPLEXOLOGIST

The Amplexologist is sometimes detected about to pocket a part in a prospective customer's plant. Especially a part being machined from a rough casting or hogged out of steel. Just the sight of it starts wheels whirling in the Amplexologist's head.

Why all the machining? Is this scrap necessary? Could we make the part out of powder metal? Eliminate machining costs. Eliminate scrap. Deliver a finished precision part for the price of a rough casting. Less, maybe?

Well! Thoughts like these are enough to make the Amplexologist forget his mother's maiden name. No wonder it sometimes takes a pointed stare to remind him to ask permission to pick up the part and take it back to the office and figure precisely how to make it better and cheaper through advanced powder metallurgy.

Customers usually forgive him the sins of his enthusiasm. It has saved them thousands of dollars. We can afford to forgive him, too. He has helped make us the world's largest, most experienced producer of powder metal parts. He is the reason manufacturers say: **When it comes to powder metallurgy—Amplex has the answer.**

FOR THE BENEFIT OF SKEPTICS . . .

The part shown is a combination gear and compound cam. Formerly, it was an 8-piece assembly: fibre gear, steel flange, horizontal steel cam, vertical steel cam, four steel screws. Then the Amplexologist went to work. Today, the part is produced by powder metallurgy as a single unit—a finished precision part that requires no machining.

Cost reduction: about 90%. What's more, the powder metal part provides longer wear, quieter operation.

Photograph permission RCA.

AMPLEXOLOGIST

SEND COUPON **. . . if you'd like to talk over your product with the Amplexologist. Don't hesitate. He's always happy to get out of the office.**

AMPLEX DIVISION • CHRYSLER CORP. • Dept. S4
P.O. Box 2718 • DETROIT 31, MICH.

Please have the Amplexologist call to look into the possibility of using powder metal parts in our product.

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

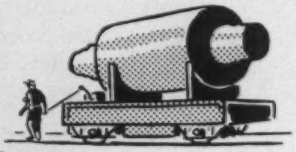
PRODUCT_____

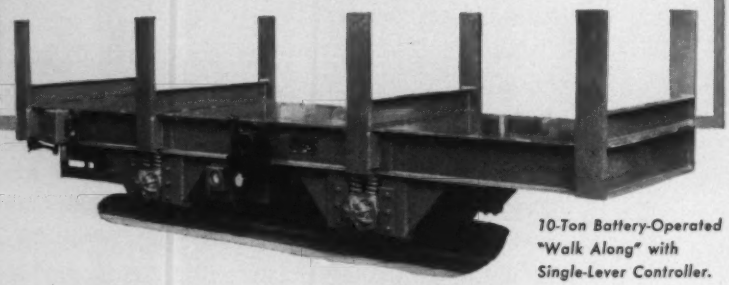
AMPLEX

DIVISION CHRYSLER CORP.

A CHRYSLER OILITE PRODUCT

Intra-plant Cross-bay Production line





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ATLAS "walk-alongs" handle your big loads with BIG savings

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Request Bulletin 1283

ATLAS CAR & MFG. COMPANY

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CALENDAR OF MEETINGS

Apr. 12-14, Steel Shipping Containers Institute Inc.: Annual meeting, Breakers Hotel, Palm Beach, Fla. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

Apr. 13-14, Malleable Founders' Society: Market development conference, Edgewater Beach Hotel, Chicago. Society's address: 781 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.

Apr. 18-19, Conference on Automatic Techniques: Sheraton-Cleveland Hotel, Cleveland. Sponsors: ASME, IRE, and AIEE. Information: J. H. McRainey, Room 530, 1213 W. Third St., Cleveland 13, Ohio.

Apr. 18-20, American Machine Tool Distributors Association: Semiannual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Association's address: 1900 Arch St., Philadelphia 3, Pa. General manager: James C. Kelley.

Apr. 19-21, American Society of Lubrication Engineers: Annual meeting and exhibit, Netherland-Hilton Hotel, Cincinnati. Society's address: 5 N. Wabash Ave., Chicago 2, Ill. Executive secretary: Calvert L. Willey.

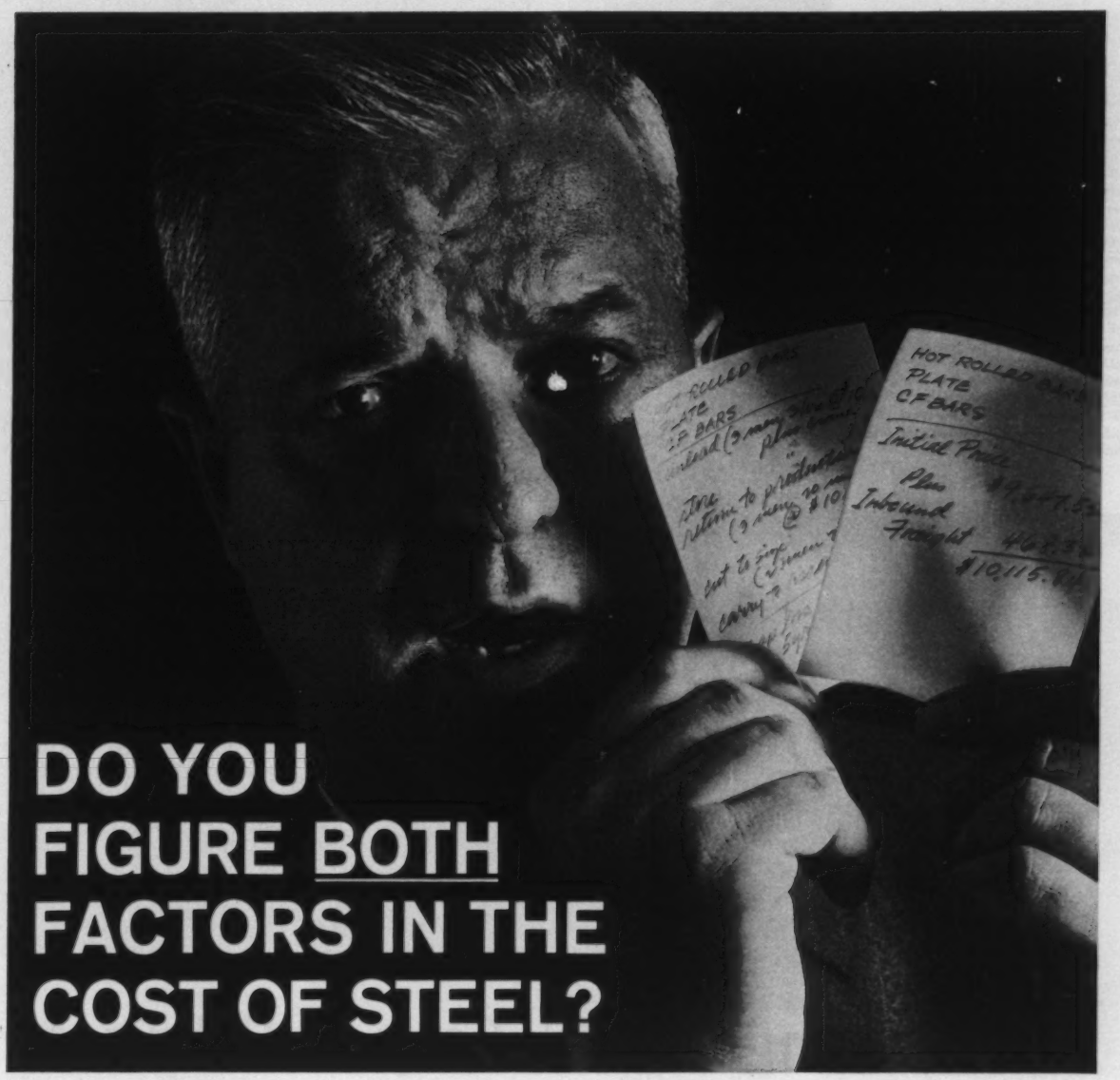
Apr. 20-22, National Association of Sheet Metal Distributors: Spring meeting, Deshler-Hilton Hotel, Columbus, Ohio. Association's address: 1900 Arch St., Philadelphia 3, Pa. Executive secretary: Thomas A. Fernley Jr.

Apr. 20-22, Rail Steel Bar Association: Annual meeting, Biltmore Hotel, Palm Beach, Fla. Association's address: 38 S. Dearborn St., Chicago 3, Ill. Secretary: W. H. Jacobs.

Apr. 21-22, American Institute of Mining, Metallurgical & Petroleum Engineers: Southwest metals and minerals conference, Ambassador Hotel, Los Angeles. Conference headquarters: Room 1234, 523 W. Sixth St., Los Angeles 14, Calif.

Apr. 21-28, American Society of Tool & Manufacturing Engineers: Tool show and annual meeting, Statler-Hilton and Sheraton Cadillac Hotels, Detroit. Society's address: 10700 Puritan Ave., Detroit. Executive secretary: Harry E. Conrad.

Apr. 24-27, Metal Powder Industries Federation: Annual meeting and powder metallurgy show, Drake Hotel, Chicago. Federation's address: 60 E. 42nd St., New York 17, N. Y. Executive secretary & treasurer: Kempton H. Roll.



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"Cost of possession is part of your total cost!"

Initial price and "possessing cost." You need both figures to know the total cost of your steel.

Often you can draw on the inventory and services of your nearby Steel Service Center to get ready-to-use steel—and save many of the possession costs made up of items you could forget to figure on—

- *Wastage you must sell as scrap*
- *Equipment for cutting and burning*
- *Tied-up capital* • *Storage space, insurance and taxes*
- *Fluctuating market prices and many others*

FREE BOOKLET—For more information get the booklet, "*What's Your Real Cost of Possession for Steel?*". Simply write Steel Service Center Institute, Inc., 540-R Terminal Tower, Cleveland 13, Ohio.

STEEL SERVICE CENTER INSTITUTE

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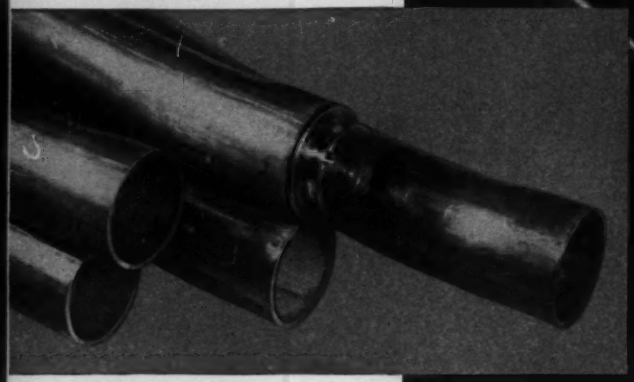

Bend, Flange, Weld, Easy-to-Fabricate ELECTRUNITE STAINLESS STEEL TUBING

ELECTRUNITE Stainless Steel Tubing and Pipe are available in A.I.S.I. chrome-nickel analyses. Sizes range from ⅜" O.D. to 5" O.D. Pipe sizes are available from ⅛" I.P.S. through 2" I.P.S. in ASA schedule 40S; from ⅛" I.P.S. through 4" I.P.S in schedule 10S; and from ½" I.P.S. through 4" I.P.S. in schedule 5S wall thicknesses.

This fabricator needed a reliable source to supply large diameter heavy wall stainless steel tube for corona rings. From its large size range, Republic was able to provide the proper tube for this vital application.

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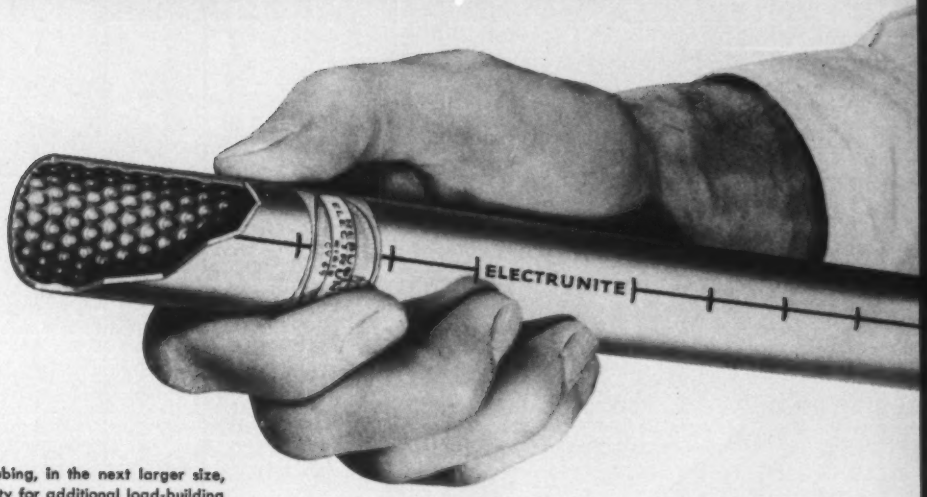
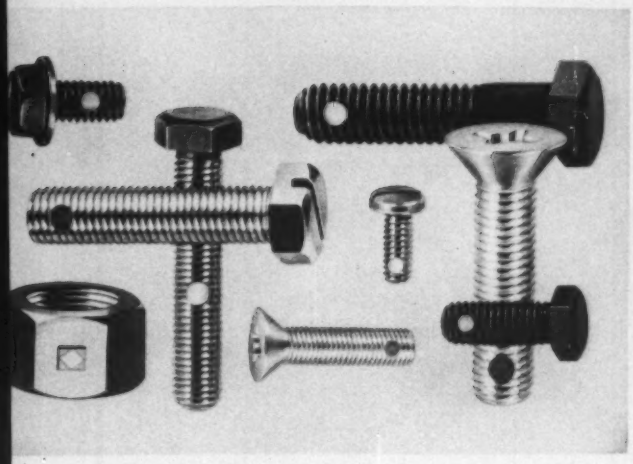
For applications requiring pressure-tested tube, Republic offers exclusive FARROWTEST—the ultimate in non-destructive testing. This eddy-current test probes for and detects defects so minute they pass other, less positive tests. Tube quality is measured for you!

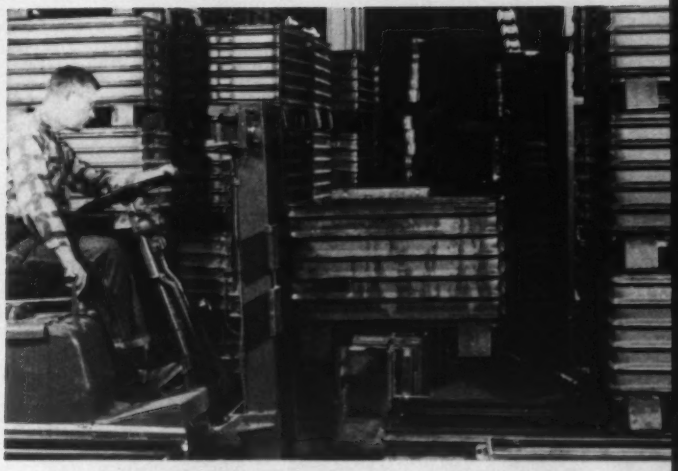
Send in your inquiries for Republic ELECTRUNITE Stainless Steel Tubing and Pipe. You'll like the product . . . and the service.



REPUBLIC ELECTRUNITE® Electrical Metallic Tubing, in the next larger size, provides raceways today with built-in capacity for additional load-building tomorrow to meet the demands of expanding production . . . at no extra cost. With the pull-in, pull-out advantages of ELECTRUNITE, you have built-in capacity up to 40% and more. Include ELECTRUNITE in your specifications for new building, plant expansion, or remodeling programs. Ask your electrical contractor, or send coupon for additional information.



REPUBLIC NYLOK® SELF-LOCKING FASTENERS provide a single-unit answer to vibration, shock, and tension. A permanent nylon insert forces mating threads together for maximum holding power in any position. The relatively inert nylon resists age and moisture; its natural resiliency permits easy adjustment and repeated use. Republic Nylok Fasteners are non-galling and require no lubricants. Send coupon for descriptive literature; specify bolts or nuts, or both.



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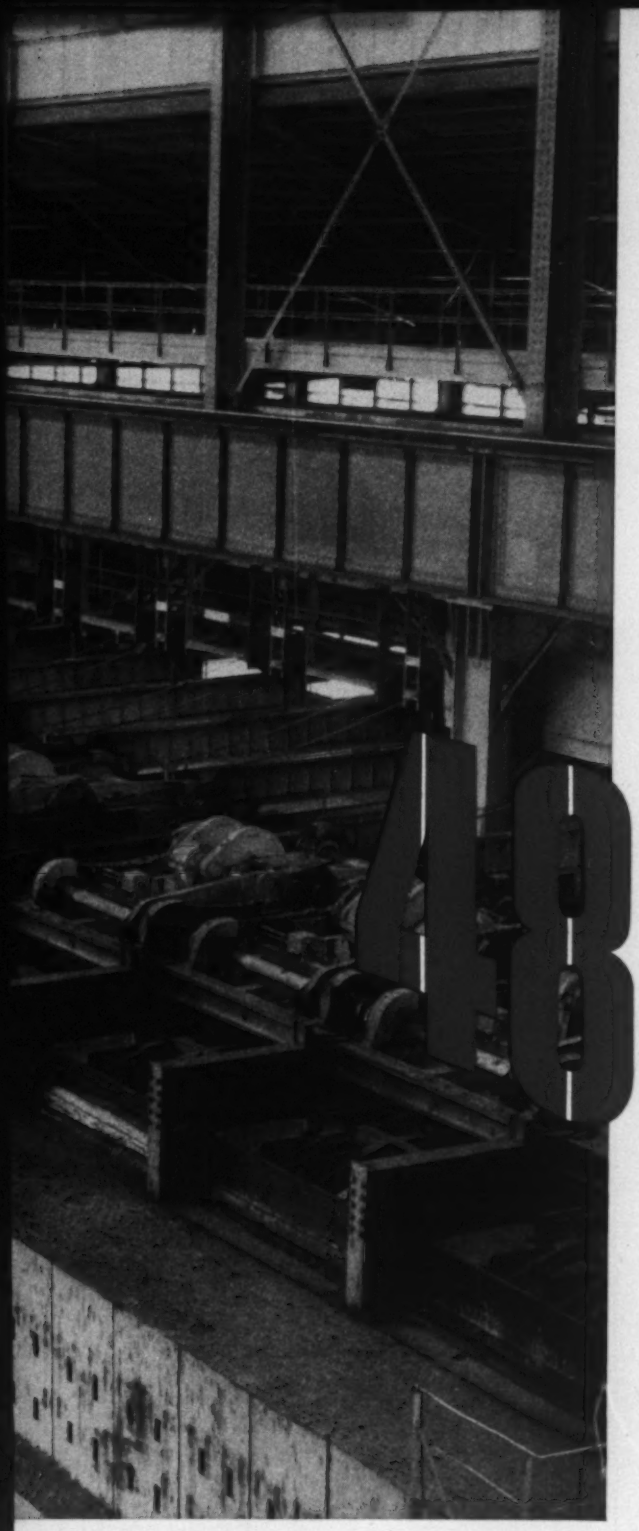

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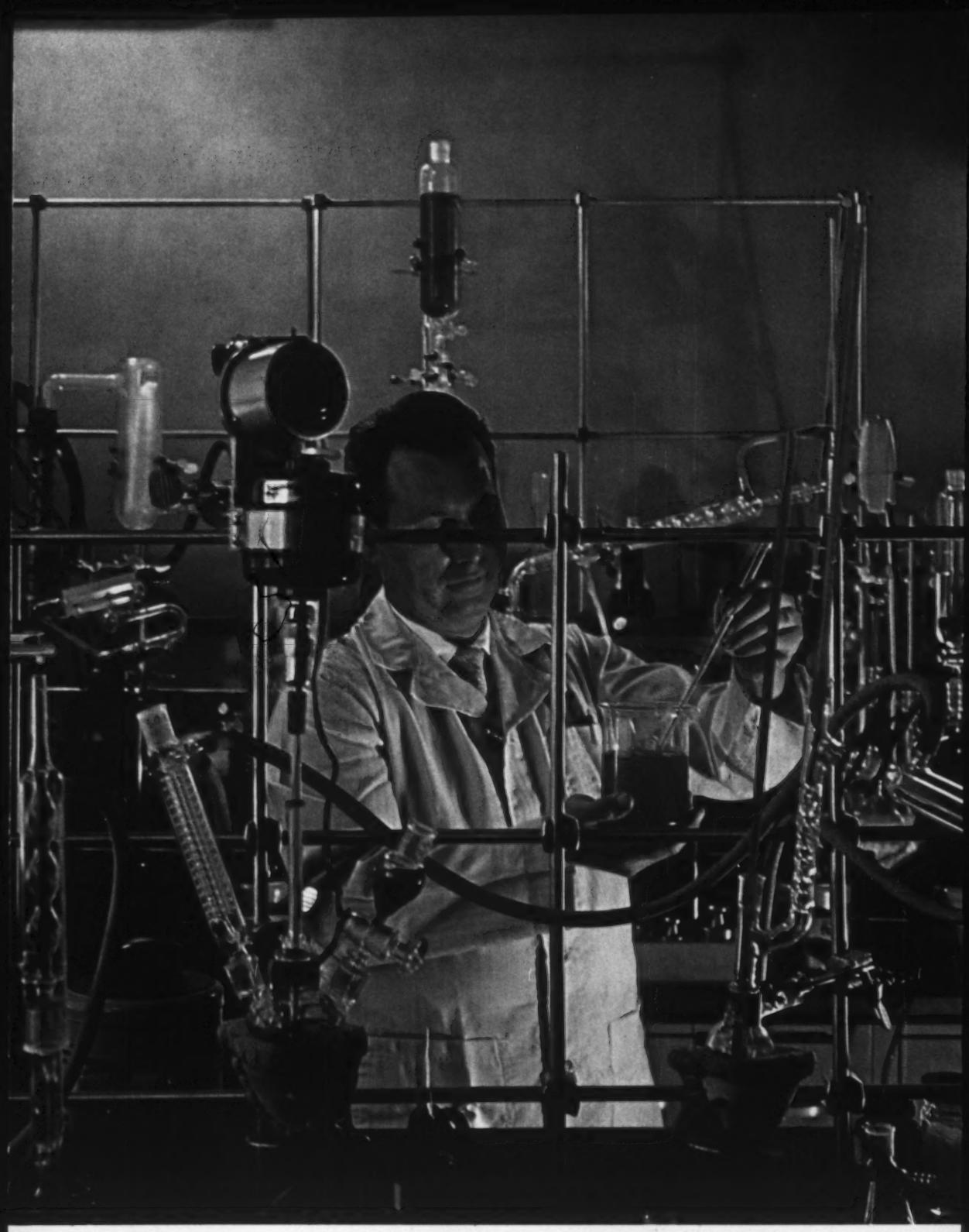

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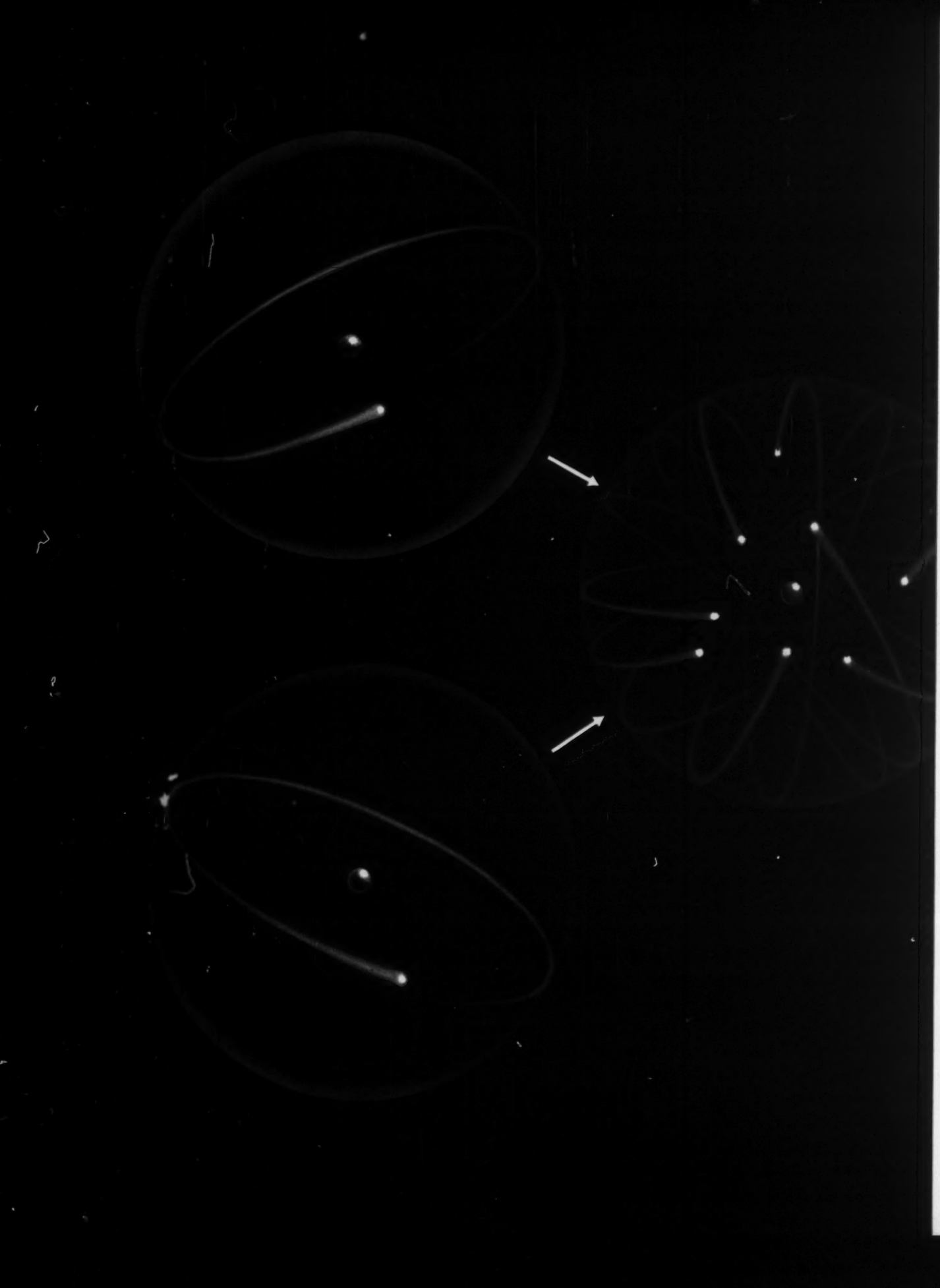
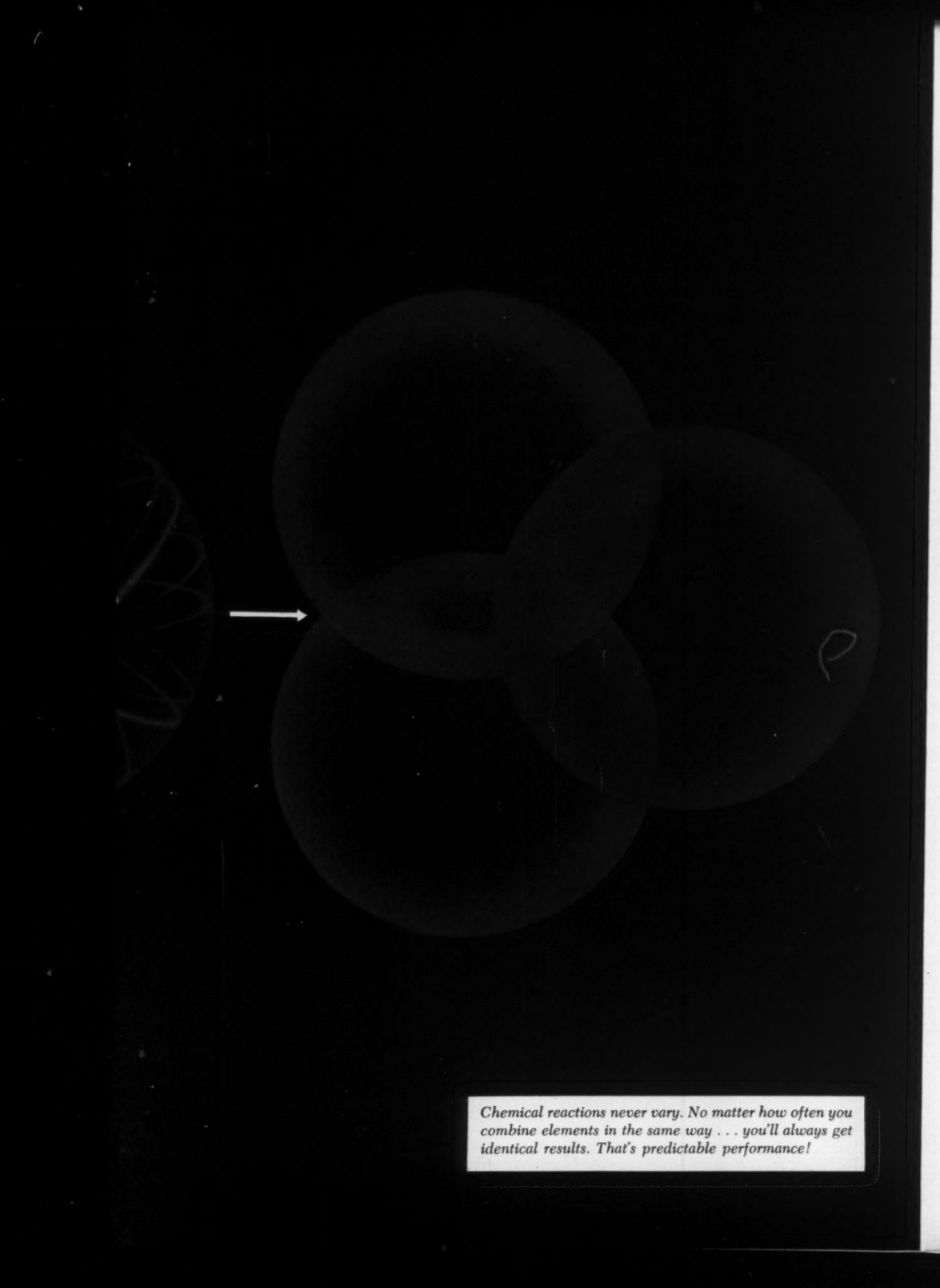


...don't you wish
you had that much faith
in the uniformity of the

stainless steel bar stock

you use?



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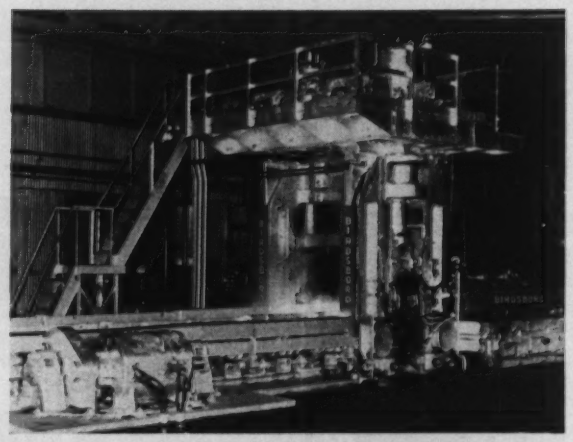
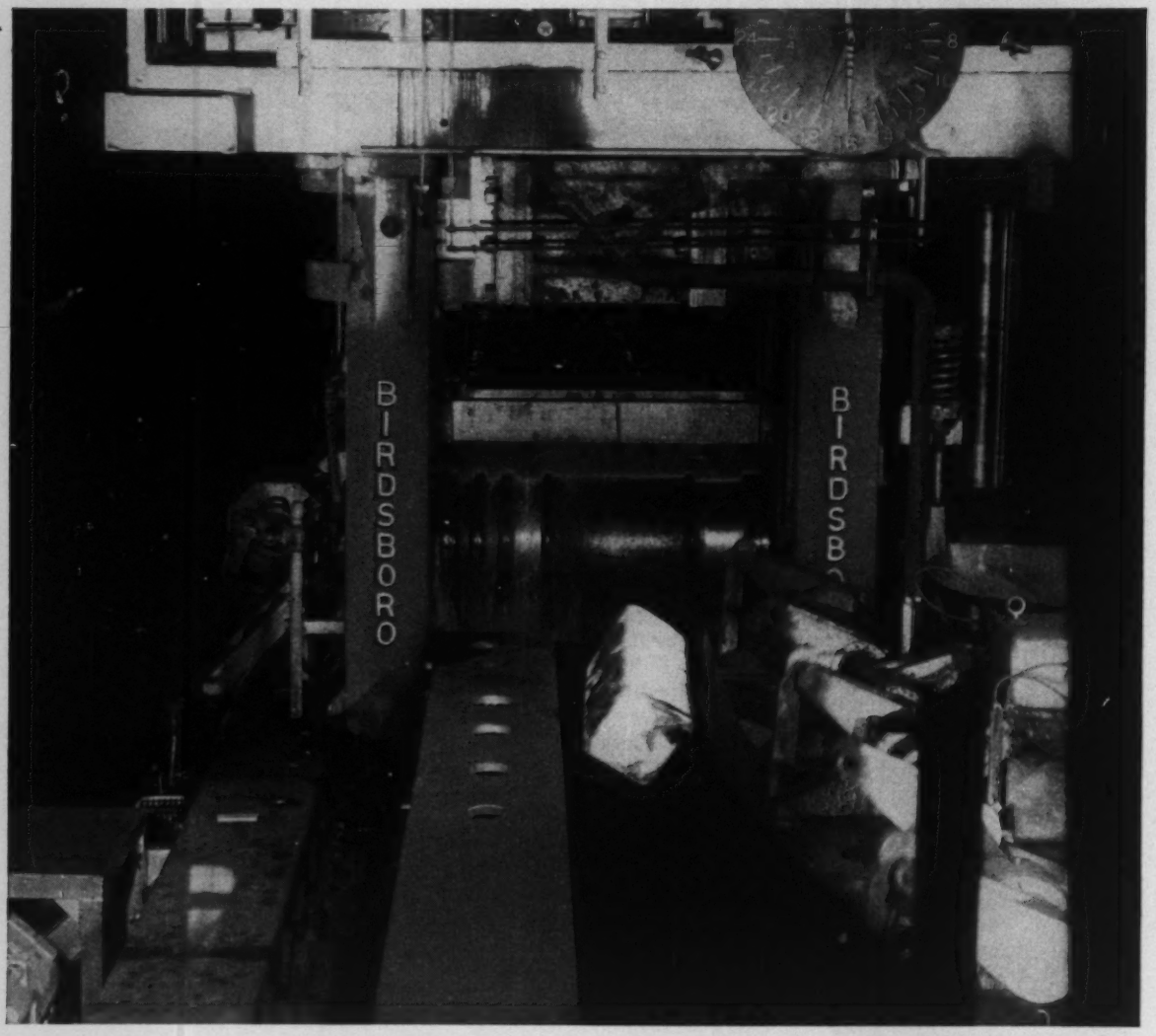
Acme Steel Co. picks production partners carefully. Many other noteworthy companies have found that our imaginative, inventive and creative approach to steelmaking fits perfectly into their plans for present and future. As BIRDSBORO has assisted Acme on this installation, we can help you. *Sales Department, Engineering Department and Mfg. Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.





MMSS-60

BIRDSBORO
CORPORATION

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel.

Best chain choice

for the hot and heavy jobs

You can increase the life-span of your conveyors with LINK-BELT Class SMGL and 1100 chains

Where operating conditions involve heat and hard service beyond the ordinary, you need the *extra*-ordinary stamina of these Link-Belt chains.

CLASS SMGL combination chains are designed specifically for furnace conveyor service. Sidebars and center links are made of "file-hard" Promal, with bosses on sidebars to reduce stress on free-floating pins. CLASS 1100 roller chain is ideal for horizontal or inclined rolling elevators and conveyors.

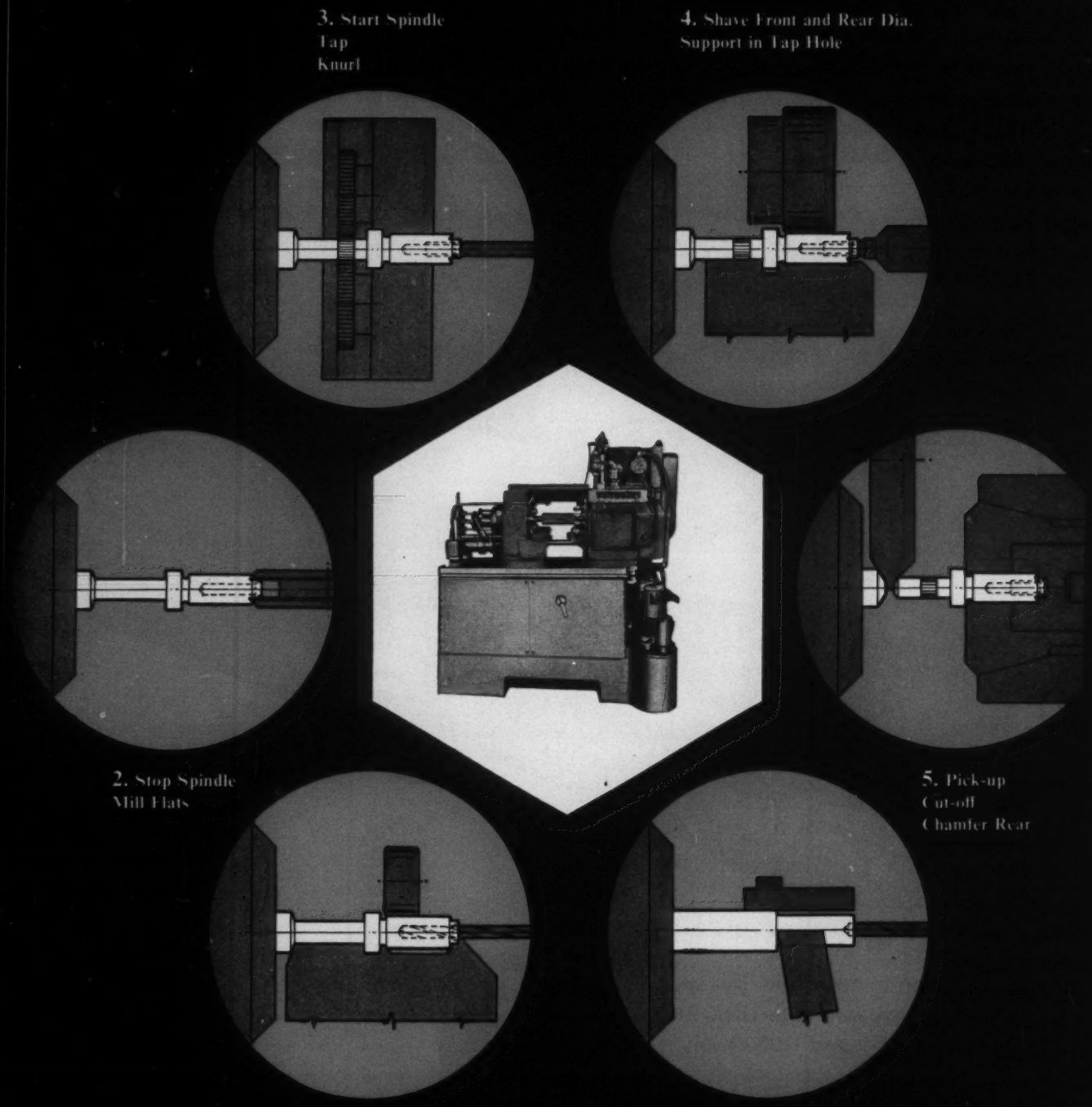
Full design information on both is contained in Catalog 1050. Your Link-Belt representative will counsel on chain selection for high temperature conditions.

Full information on these chains . . . plus a broad line of attachments and sprockets—is contained in Catalog 1050. Get your copy by writing direct . . . or call your nearest Link-Belt office or authorized stock-carrying distributor, listed under CHAINS in the yellow pages of your Phone Directory.

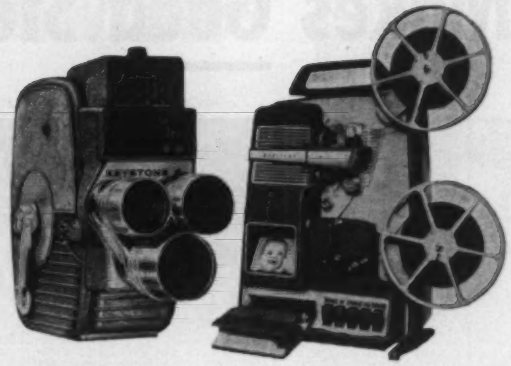
LINK-BELT

CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,075



9 operations in 3.8 seconds . . . one of the typical parts produced by Keystone Mfg. Co. on the [illegible] RA-6 Bar Automatic



85,000 Pieces Per Day And No Rejects

Production *facts* tell a typically impressive story of Acme-Gridley machining efficiency at Keystone Manufacturing Company, Boston, Mass.

"We have five 7/16" RA-6 Spindle Bar Automatics", states a Keystone executive. "Everyday, they produce an average of 85,000 precision parts for our cameras and projectors . . . and yet, there are literally no rejects. As a result of this consistent conformance to our tough tolerances, scrap losses have been wiped out and inspection time reduced to an all time low. What's more, because Acme-Gridleys produce in a single set-up jobs otherwise requiring secondary machining, we've cut production costs."

Dramatic and *tangible* savings like those realized by Keystone are commonplace with Acme-Gridleys. Such features as a wide open tooling zone, direct camming and independently operated tool slides can help you achieve higher mass production efficiency at lower cost. We'll be happy to supply complete information on the world's most complete line of multiple and single-spindle automatic bar and chucking machines. Call, write or wire.

National Acme's "Zone of Responsibility" includes all phases of cost reduction
Check YOURS . . . Then Check National Acme

Direct Costs: these include direct dollar savings as realized by Keystone Manufacturing Co. . . . an "everyday" job for Acme-Gridleys. **Indirect Costs:** effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc. **Product Redesign:** teaming with your design group to take full advantage of Acme-Gridleys' cost reducing capabilities. **Direct Material Costs:** our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems. **Make-or-Buy Reviews:** in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment. **Spot Modernization:** pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.

National Acme

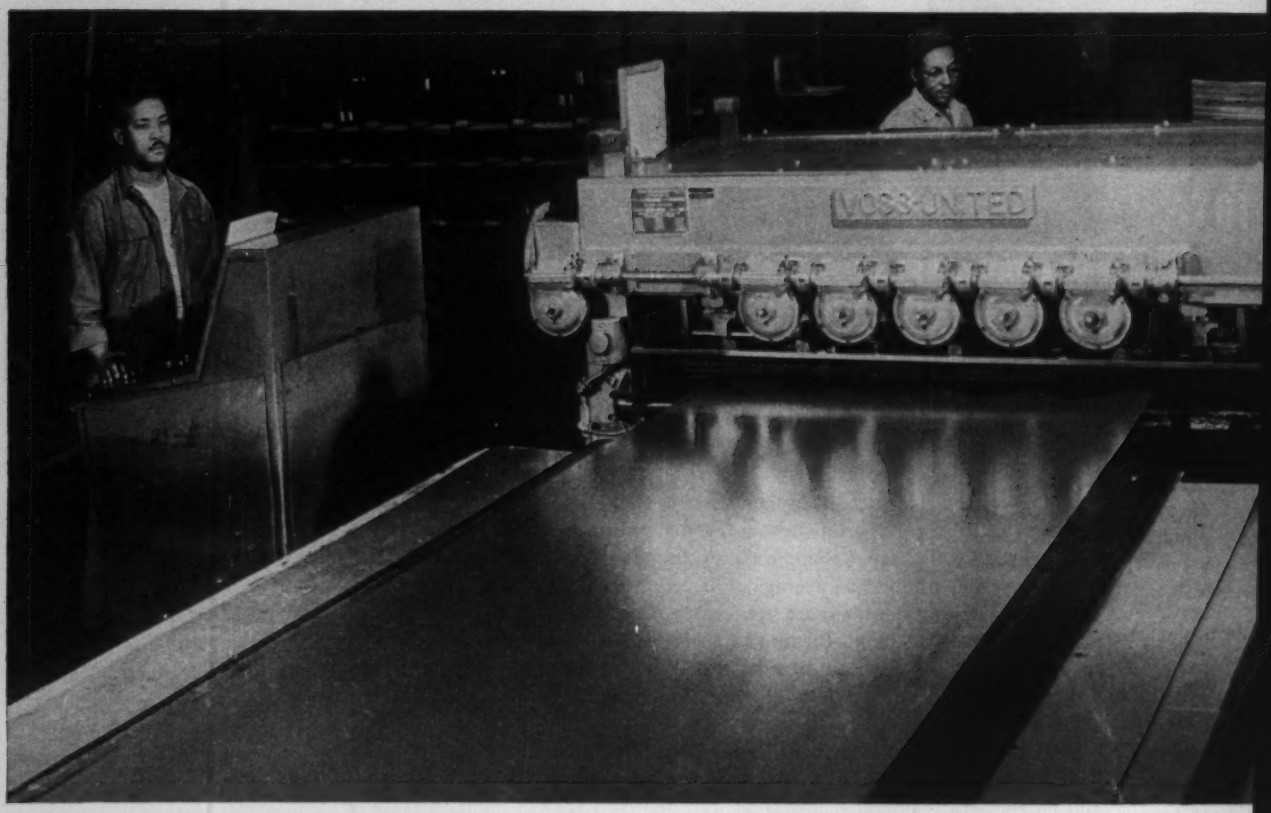
The National Acme Company
189 E. 131st Street
Cleveland 8, Ohio

Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.

MMT=PE

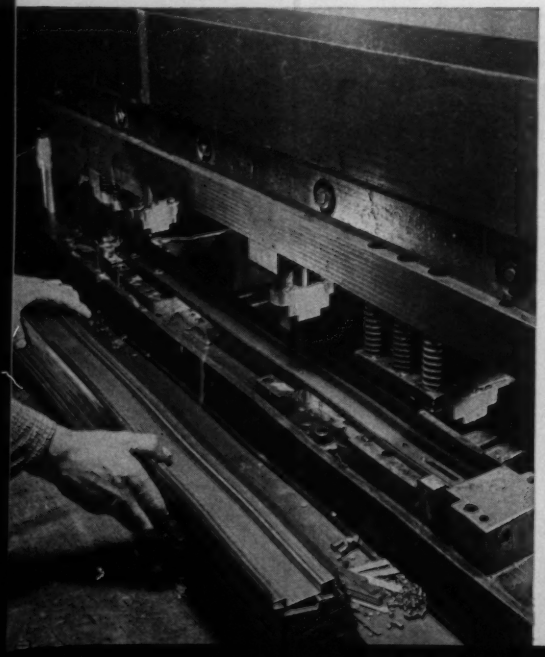
Pittsburgh Steel Sheet Used . . .

Where Flatness Makes Good Steel

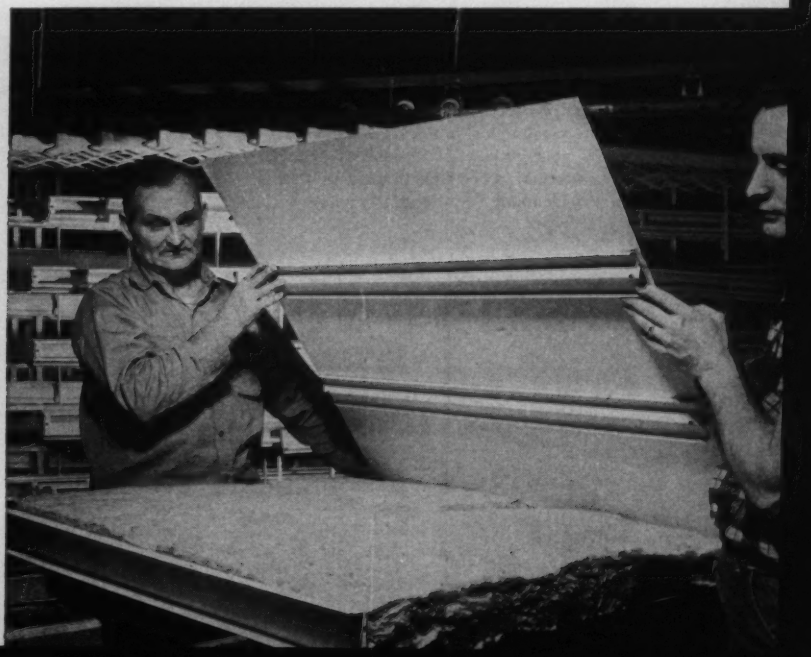


Roller leveling to achieve dead flatness is easy with Pittsburgh Steel Co. Sheet, says The E. F. Hauserman Co.

A vertical member, showing sharp corners and severe bends, is embossed and punched on this 500-ton Cincinnati press brake.



Assembly for a flush steel and glass panel is being completed here. Rock wool batting provides sound control and insulation. Note reinforcing ribs on back of panel being placed on "sandwich."



Sandwiches

E. F. Hauserman hates ripples . . . The E. F. Hauserman Co., that is.

The Cleveland firm, world's largest producer of movable, interior walls, hates ripples because any kind of ripple in a wall panel is very visible to the eye. The slightest ripple produces a pattern of light and shadow.

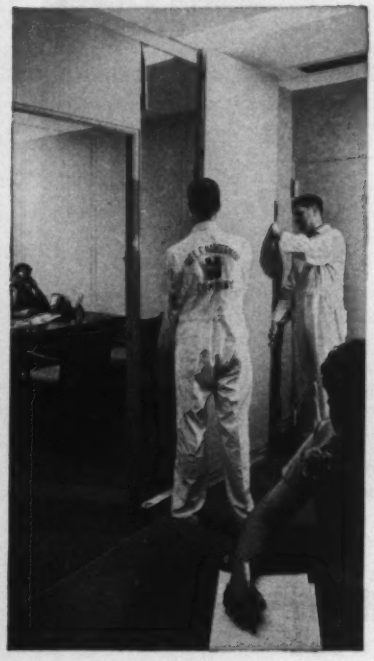
To avoid rippling walls, The E. F. Hauserman Co. uses large quantities of cold rolled sheet steel from Pittsburgh Steel Co. because it's easy to achieve dead flatness with Pittsburgh Sheet.

Pittsburgh Steel Co. is one of the leading quality producers of cold rolled sheet steel—the most important raw product in the Cleveland plant. Hauserman must have flat panel plates which can be roller leveled to dead flatness. Sheet provided by Pittsburgh Steel helps achieve dead flatness with a minimum of processing.

The Hauserman company designs, engineers, manufactures and erects movable interior walls for commercial, industrial and institutional buildings on a nation-wide scale. Steel partitions provide greater movability, better appearance, lower maintenance, earlier occupancy, good access for utilities, efficient sound control, fire safety, greater rigidity and low cost through use of economical steel.

Paint line shows partition panel measuring 7 feet by 36 inches getting a primer coat. Good surface of Pittsburgh Steel's sheet shows up here where any flaws would mar paint job.

Typical installation of a Hauserman movable wall can be made without chasing occupants out of offices.



• **Gage**—Hauserman watches gage very carefully. Their Wean slitter is equipped with an Easterline-Angus electronic recording device which makes a written record of every inch of sheet processed. Pittsburgh Steel meets specifications for gage consistently.

• **Formability**—While flatness is a prime consideration, Hauserman also insists on excellent formability in sheet steel.

A great variety of formed parts, including cornices, inner bases, post caps, bases, spreader channels and reinforcing ribs, are made with severe bends and sharp corners. In some parts a lip of steel is bent back on itself through a 180-degree angle.

Because cold rolled sheet supplied by Pittsburgh Steel takes these strains without rips or tears, Hauserman has less scrapped material.

• **Surface**—Steel panels get three in-process inspections to make sure surfaces of panels and component parts are free of flaws. Defect-free surfaces make it possible for Hauserman to spray paint with assurance that the paint job won't be marred by flaws showing through.

• **Weldability**—Finally, Hauserman demands good weldability. Component parts and assemblies are fastened by both flash and resistance spot welding. Pittsburgh sheet makes a better product and reduces operating costs by taking a good weld without slowing production.

When a sheet user as exacting as The E. F. Hauserman Co. finds Pittsburgh Steel Co. sheet meets requirements consistently, you and other sheet users can confidently order from Pittsburgh Steel. Whatever your requirements may be—flatness, formability, surface, uniformity in gage, weldability or deep drawing quality—you'll benefit from putting Pittsburgh Steel sheet on your production lines. Trained personnel is available to help with any steel problem. Call a Pittsburgh Steel man today. You'll find him in any of the district offices listed below.

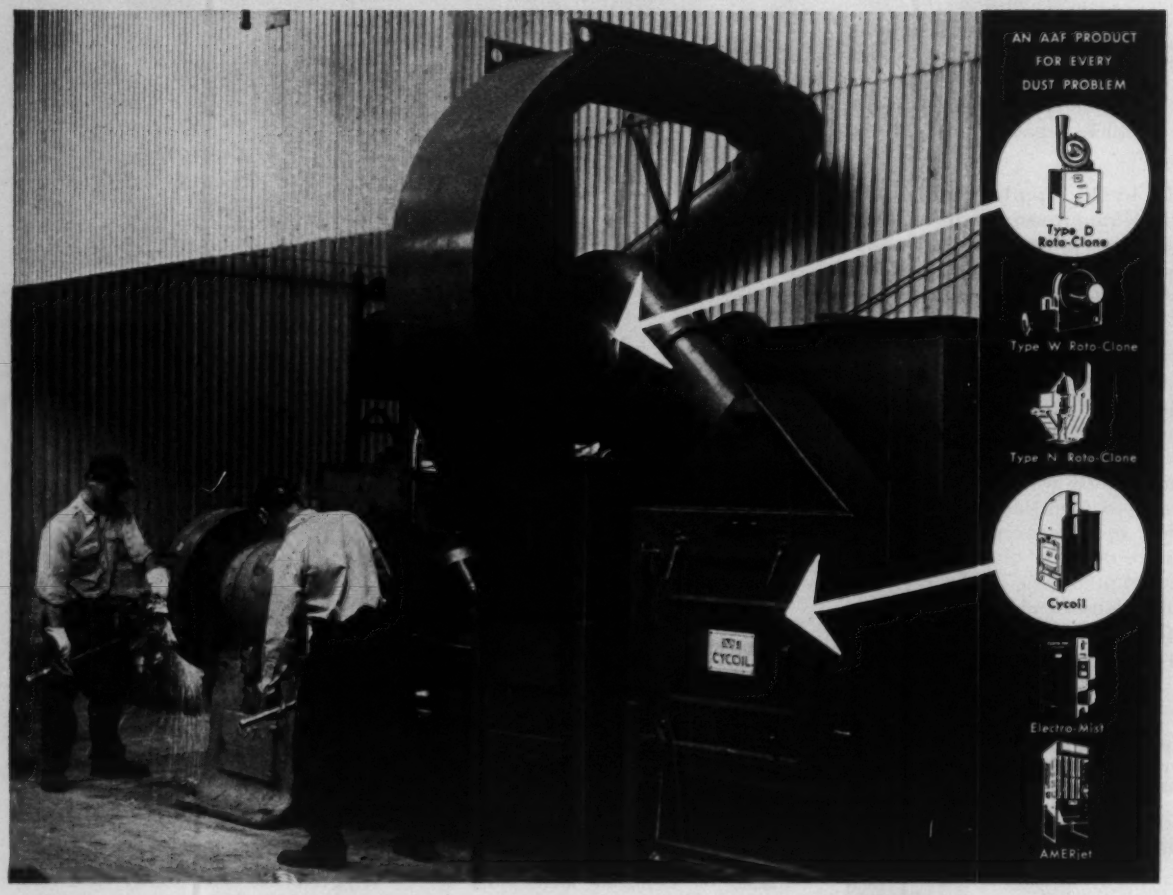
Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Atlanta	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
			Philadelphia	Warren, Ohio

GRINDING



AAF ROTO-CLONE-Cycoil system saves money for Duer Spring Co.

● Here's what AAF's team of Type D ROTO-CLONE and Cycoil is doing for Duer Spring Company, McKees Rock, Pennsylvania: (1) eliminating *all* spring grinding dust, (2) saving on fuel bills by returning cleaned air to workroom, and (3) lowering maintenance costs by preventing oxidation to building. Most dust particles are removed by the Type D, and the Cycoil eliminates the rest!

AAF's complete line of dust control equipment was application-developed, now challenges *any* metalworking dust problem. Where are troublesome dust, fumes or mists causing you trouble—grinding, buffing, polishing, plating, dry machining, wet machining, heat treating, abrasive cleaning? All can be effectively and economically controlled by AAF.

If grinding dust is your problem, call your local AAF representative, or write direct for Type D ROTO-CLONE Bulletin 272A and Cycoil Bulletin 285A. Address Mr. Robert Moore, American Air Filter Co., Inc., 443 Central Ave., Louisville, Ky.

AAF **American Air Filter**

BETTER AIR IS OUR BUSINESS

Laboratory facilities at Standard have kept well in step with the revolutionary advances which have been made in the field of metallurgy during the past decade. Plant facilities, too, are geared to produce even the most exotic of special alloys which today's industry demands.

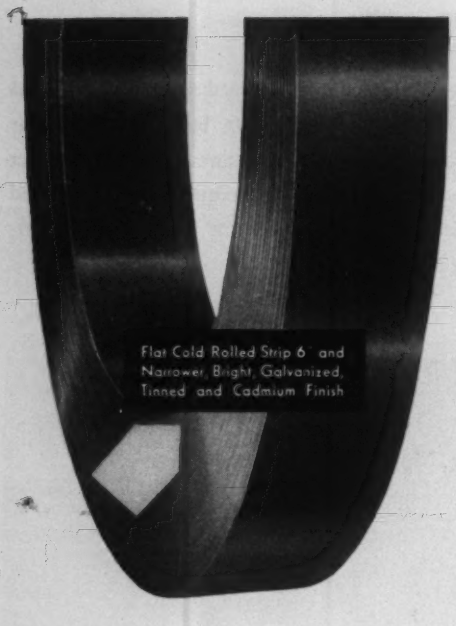
And Standard's famed personalized service means that your most difficult problems can be resolved by our metallurgists and engineers and assures a finished product which meets your most exacting requirements, delivered in record time. Write today for the illustrated booklet, "Quality Control at Standard."

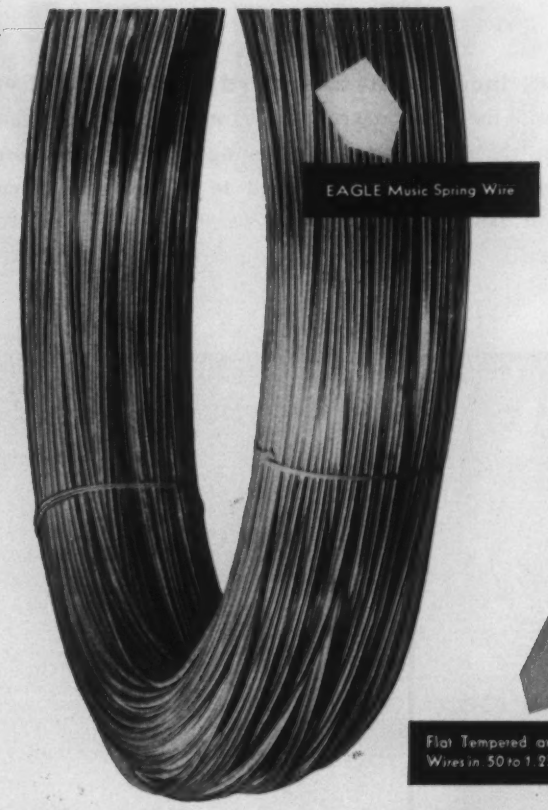
Standard Steel Works Division

BALDWIN · LIMA · HAMILTON

BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes





Here is the WASHBURN WIRE FAMILY

made to your specifications to insure the Quality of YOUR Product.

110

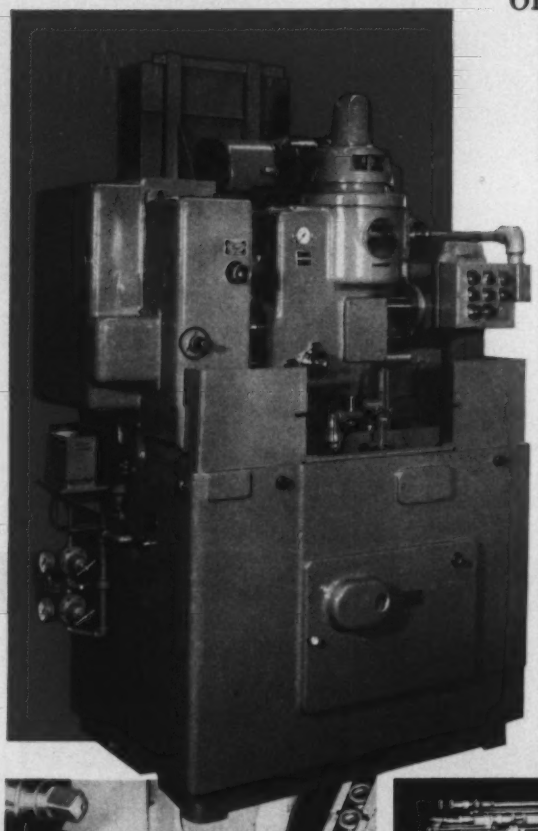
WASHBURN

WASHBURN WIRE COMPANY, NEW YORK CITY

CLEAN, UNIFORM BILLETS–STRIP–RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

AUTOMATIC WORK HANDLING

Is A Natural Complement to the High Production Rates of the Fellows 4GS Gear Shaper

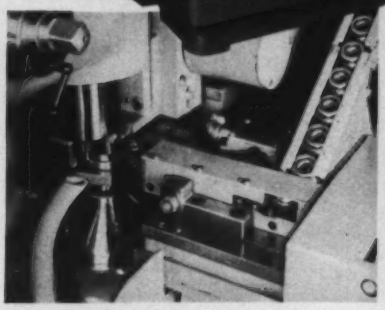


Although designed for both manual and automatic loading, the 4GS Fellows Gear Shaper makes best use of its high production rates when equipped with work handling devices.

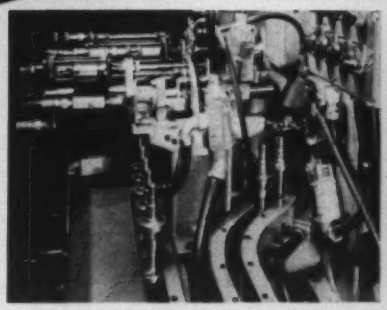
The physical construction of the machine is such that it may be easily adapted for use with magazines and chutes for automatic loading and unloading at substantial cost savings on continuous production runs.

Ask your Fellows representative about the many advantages of automatic work handling with the 4GS Fellows Gear Shaper, or write direct to the Fellows Gear Shaper Company.

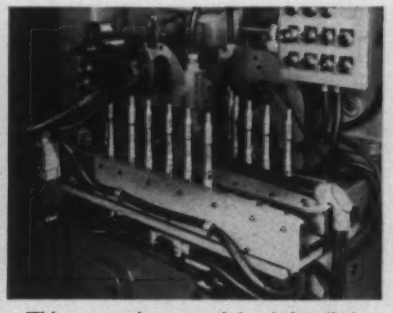
THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont, U. S. A.
Branch Offices:
1048 North Woodward Ave., Royal Oak, Mich.
150 West Pleasant Ave., Maywood, N. J.
5835 West North Avenue, Chicago 39
6214 West Manchester Ave., Los Angeles 45



These internal clutch parts are fed automatically from a vibratory feeder down a chute to the magazine slide from which they are located and clamped. The cutter spindle is automatically stopped at the top of its stroke for clearance during the loading and unloading cycle. Cutting time is 1½ minutes. *Gear Data:* 10 Teeth, 12.4 Pitch (Stubbed), 30° Pressure Angle, Spur, 5/32″ Face Width.



This transmission cluster gear shaft is handled by two sets of air-operated "fingers" mounted on a turret. As the turret rotates, one set of fingers moves the finished piece to the unloading chute while the other set brings the new blank into position. Cutting time is 35 seconds. *Gear Data:* 10 Teeth, 12.4 Pitch (Stubbed), 30° Pressure Angle, External Spur, 5/32″ Face Width.



This automotive stem pinion is handled in the same manner as the cluster gear. In both cases, safety devices prevent the machine from starting unless the blanks are in the correct cutting position. Loading and unloading chutes may be hand or conveyor fed. Cutting time is 2½ minutes. *Gear Data:* 17 Teeth, 10 Pitch, 19° 30′ Pressure Angle, 32° 51′ Helix Angle, ⅝″ Face Width.

THE PRECISION LINE **Fellows** *Gear Production Equipment*

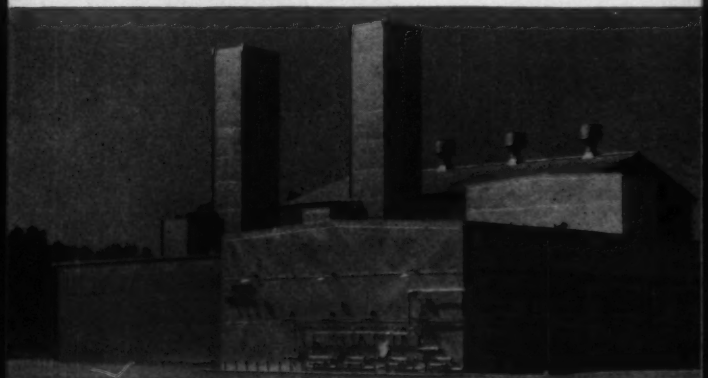
HOW ACME STEEL MADE HISTORY

WITH OXYGEN

In mid-1959, when the first heat was poured at Acme Steel Company's new 35 million dollar plant at Riverdale, Illinois, steel was made for the first time in North America by the combination of continuous hot blast cupolas and top blown oxygen converters. New speed and economy were brought to the production of high quality steel . . . and Acme's finishing mills were assured a supply of ingots at lower cost to serve an expanding list of customers.

A striking highlight of Acme's accomplishment is that just a few years ago the company did not produce any of its own steel! Semi-finished steel for its hot and cold rolled products was all purchased, subject to constantly changing prices and delivery schedules. When the company planned to integrate its operations, a key factor was a reliable, low-cost supply of high purity oxygen for the converters. Acme called on Air Products for engineering and cost studies, and made the decision. As a result Air Products installed directly adjacent to the mill a generating facility that can supply Acme with more than 80 million cubic feet of high purity oxygen per month, at no capital investment to Acme. Acme's converters get all the oxygen they need at the low cost that makes this new process feasible.

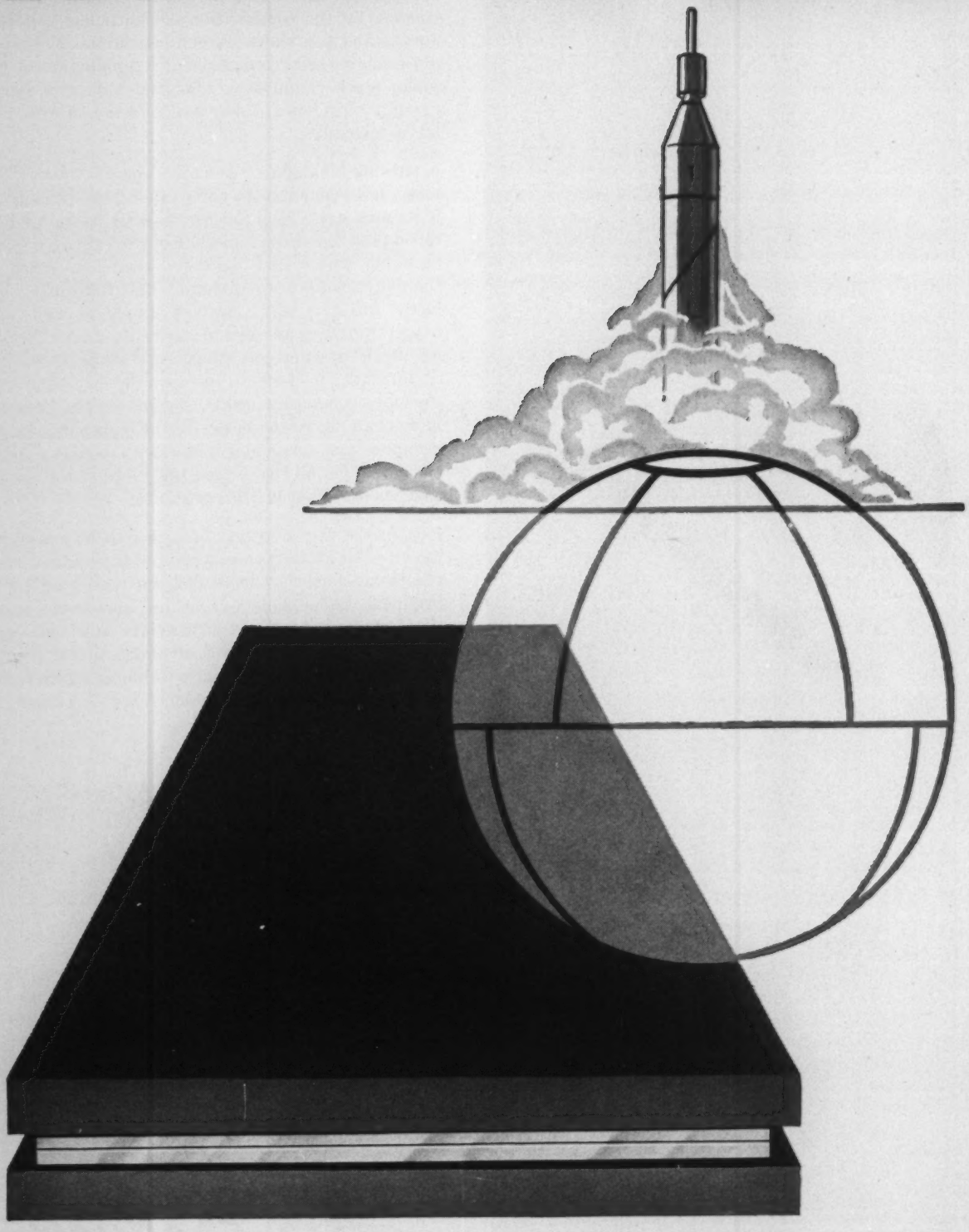
Helping the steel industry put oxygen to work profitably has been Air Products business for over 20 years. On-site generating facilities, pioneered and perfected by Air Products, have made oxygen an easy-to-get utility, sliced its cost by 80%. Progressive steel companies across the nation are taking advantage of Air Products long experience and up-to-date technical services. Let's talk about *your* needs. Air Products, Inc., Allentown, Pa.



Air Products oxygen facility supplying Acme Steel Co.

Air Products
...INCORPORATED

WHAT IS CF&I—

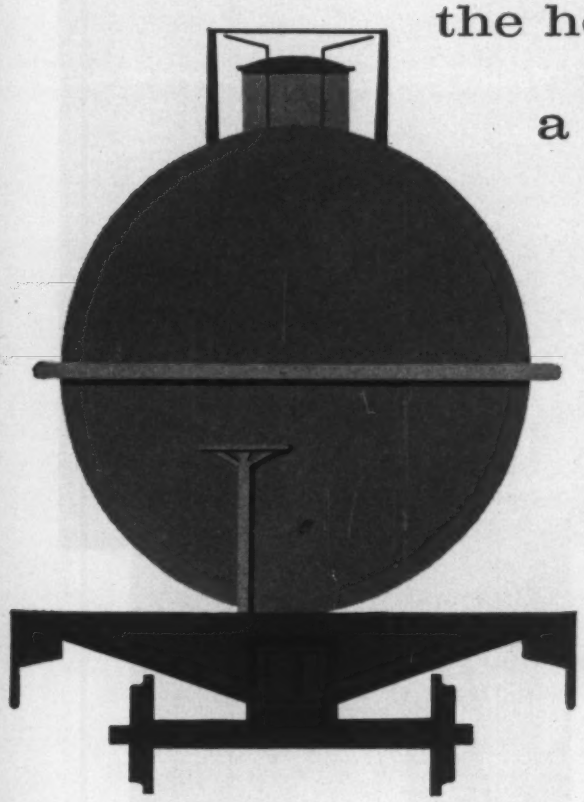


CLAYMONT?

CF&I-Claymont is a steel sandwich...

the head of a tank car...

a vault for missile fuels



Claymont bears the CF&I trademark; it is an important part of this major steel company. Claymont is ability—the ability to manufacture steel plate and plate products to the most demanding customer specifications.

Claymont is an integrated steel mill that rolls carbon and alloy steels into plates of many sizes, shapes and thicknesses. Some of these are made into steel sandwiches — stainless steel plates inseparably bonded to carbon or alloy steel backing plates. These stainless-clad plates are used in many applications requiring corrosion and abrasion resistance. Other plates are spun or pressed into heads, some of which may become integral parts of railroad tank cars. Claymont also makes plates into many special shapes and parts; one example–a container for liquid oxygen rocket fuel.

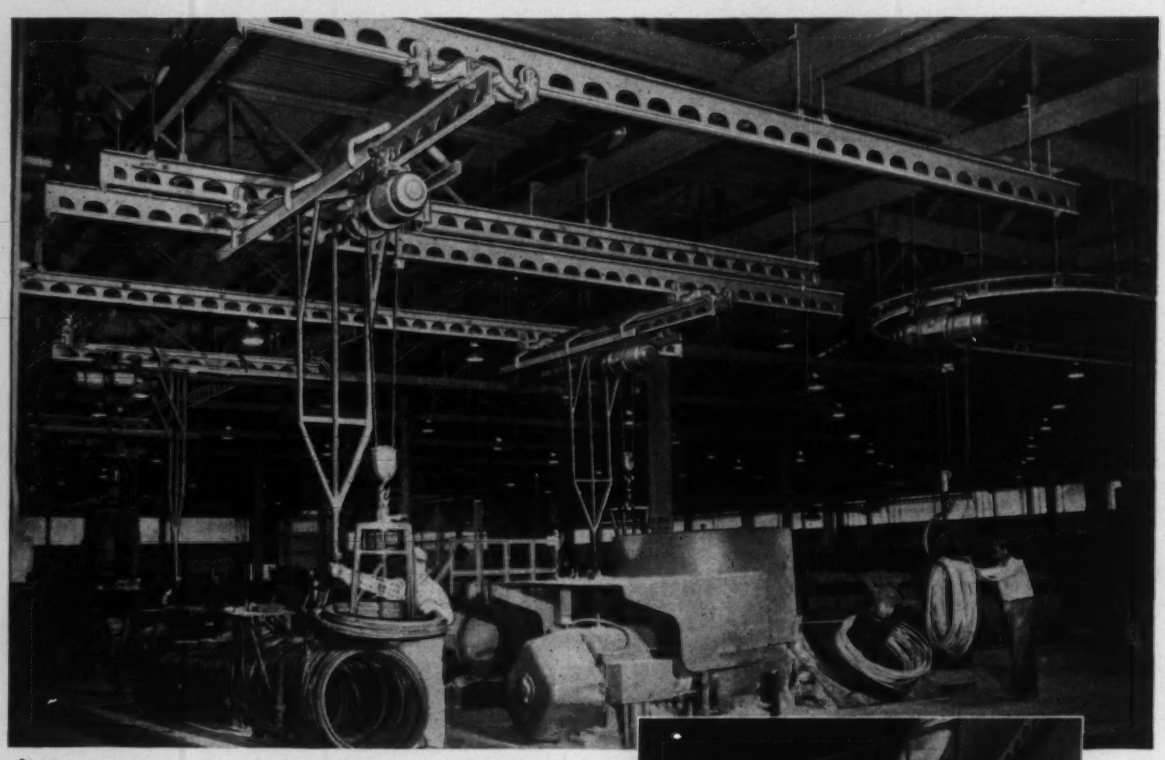
Claymont invites you to tour our plant whenever you're in the neighborhood. You'll find our modern Fabricated Plate Shop of special interest. In the meantime, you can receive complete information about CF&I-Claymont's facilities and services from any CF&I office. 7830

CLAYMONT STEEL PRODUCTS
THE COLORADO FUEL AND IRON CORPORATION
DENVER • OAKLAND • NEW YORK
sales offices in all key cities

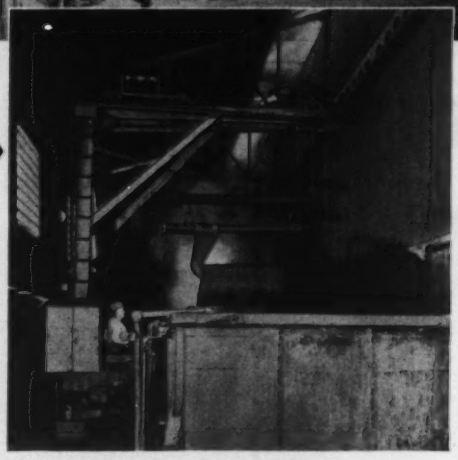
CF&I STEEL

RUGGEDLY BUILT HANDLING EQUIPMENT FOR WIRE AND ROD MILL SERVICE

Cleveland Tramrail Equipment FULLY PROVEN On Hundreds of HARD-DUTY Applications



Cleveland Tramrail is easy to install and use. Much of the equipment has been especially designed for wire and rod handling service.



Cleaning house gantry crane. This is one of many Cleveland Tramrail developments that have brought important advantages to the wire and rod industry.

PRODUCERS and fabricators of wire and rod throughout the United States and Canada have long depended upon Cleveland Tramrail overhead materials handling equipment for a wide variety of handling operations.

Cleveland Tramrail is a leader in the development of equipment to especially suit the needs of this industry. For instance: (1) Carriers with special extended propelling arms for block-stripping service as illustrated above; (2) Hairpin-Hook grab for coil handling; (3) Vertical-storage grab for fast selective coil storage; (4) Crane with rotating and tilting hook for horizontal coil storage; (5) Several types of gantry cranes for low-cost efficient cleaning of wire and rod.

For real help on wire and rod handling problems based upon extensive long-time experience with the foremost names of the industry, call your local Cleveland Tramrail sales engineer.

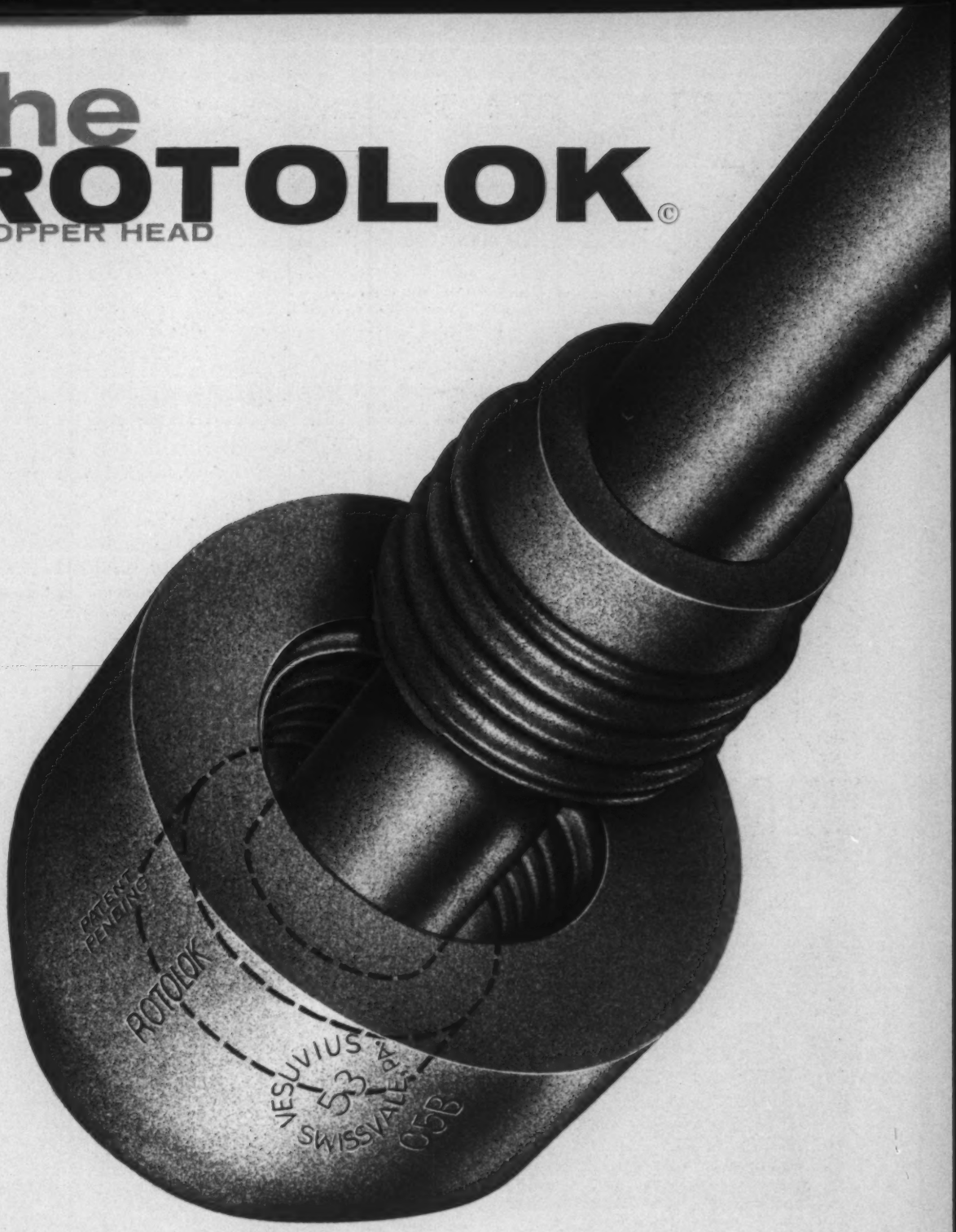
Write for free booklet No. 2008

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7826 E. 288 ST. • WICKLIFFE, OHIO

the ROTOLOK©
STOPPER HEAD



Conceived and developed by

VESUVIUS CRUCIBLE COMPANY

for the metal pouring industry

SWISSVALE **PITTSBURGH 18, PA.**

"When we increased our participation, our company benefits jumped!"

"I'm convinced that any company benefits by the Payroll Savings Plan. When employees invest regularly in U.S. Savings Bonds they feel more secure; they know they're helping themselves to safeguard their futures. Savers are *safer* workers, too. And they're proud to help build a stronger America.

"Logically, then, the more employees we have enrolled, the greater our own benefits will be. So I began wondering *how many* of our people were subscribers. When I checked, I got the surprise of the week—less than 30%!

"Of course, we have a certain amount of turnover: new people coming in constantly... some leaving for other jobs. Then, too, many of our employees just never got around to signing that handy little card.

"Right away I talked with our State Savings Bonds Director. With his help we carried the Payroll Savings Plan story to *every* person in our firm. You know, Bill, people like to be invited, *personally*, to join a group like this.

"Our response to this friendly canvass was amazing. Now we have better than 45% of our staff enrolled—and the percentage is gaining every payday."

If *your* company has less than 50% employee participation in the Payroll Savings Plan, you are missing substantial benefits. Contact your State Savings Bonds Director for expert, friendly help in making a person-to-person canvass in your company.

ALL U.S. SAVINGS BONDS—OLD OR NEW—EARN ½% MORE THAN BEFORE

STEEL
The Metalworking Weekly

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

Advantages for You

IT ALL COMES DOWN to one fact... that you can always count on Roebling high carbon flat spring steel to reduce preparation time, machine stoppages and rejects to a minimum. What's more, it's made as you want it... annealed, hard rolled untempered, scaleless tempered, tempered and polished, blued or strawed.

You pay for the best every time you buy flat spring steel. Make sure you *get* it. Specify Roebling. For details, write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

A few of the thousands of high-quality items made from superior Roebling cold rolled steel.

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division • The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it

PHOTO BY W. RANUS

Flash butt-welding an extruded section resulted in a 65% material reduction

By specifying an extrusion that allowed only a thin envelope of material around the finished cross-section, Amweld engineers saved 37 lbs. of 321 stainless—and eliminated considerable machining time. Amweld flash butt-welding know-how produced a ring that more than satisfied the critical strength requirements for this jet engine shroud.

Amweld is equipped to supply flash butt-welded rings and circular products in stainless, titanium, aluminum, as well as a wide variety of corrosion-resistant alloys. If you would like to know more about Amweld's welding, fabricating and machining facilities, phone or write.

GET THE FACTS ABOUT AMWELD

New 20-page catalog describes flash butt-welded rings and circular products manufactured by Amweld. Also booklet entitled, "How Flash Butt-Welded Rings are Made."

AMWELD® INDUSTRIAL PRODUCTS

THE AMERICAN WELDING & MFG. CO. • 110 DIETZ ROAD • WARREN, OHIO

Another 'Rarick Rebellion' Coming; McDonald Seems Safe

Look for the "dues protest rebels" of the United Steelworkers to present a slate of nominees for international offices at the elections next February. And they'll try to unseat some supporters of David McDonald in local elections this June. Nicholas Mamula, one of the original protesters and president of Local 1211 (at Jones & Laughlin's Aliquippa, Pa. plant) is calling the new labor contract a "bag of crumbs." Mr. McDonald is firmly in the saddle now and probably won't be thrown by the rebels.

Building Costs Stay on Plateau

This year's first quarter ended with building costs at the same level they held in December, 1959. There has been little change since the fall of 1957, as the Austin Co. trend line (above) shows. The firm says most factors that influence building costs are still operating for stability.

Construction Contracts Up; Completions Down

Heavy construction contracts in March spurted 14 per cent above the February level to bring the first quarter total to $4.7 billion—up 1 per cent from the 1959 pace, reports *Engineering News-Record* . . . Total construction put in place during March amounted to $3.7 billion—down 5 per cent from the February level, although seasonal expectations call for a rise of around 8 per cent in March, says the Commerce Department . . . Shipments of construction equipment this year should hit $2 billion vs. $1.8 billion last year, American Iron & Steel Institute predicts.

Prediction: Nuclear Powerplant in Orbit

By 1970, the U. S. will be able to orbit a nuclear powered electric generating system with a capacity of 60,000 kilowatts—enough to supply the residential needs of a city about the size of South Bend, Ind. So asserts John W. Simpson, vice president, Westinghouse Electric Corp., who believes we could generate 1 kw of energy in space for every 4 lb of payload.

Where Appliance Research Efforts Are Going

Harold Massey, managing director, Gas Appliance Manufacturers Association, reports that the industry is working on . . . furnace blowers, boiler pumps,

refrigerator fans, defrosters, dryer drums, and like devices powered by thermoelectric devices and fuel cells . . . a flameless burner in a thin, flexible tube to produce heat directly only where it is needed, not in the surrounding space . . . Gas infrared heating to produce seat-by-seat comfort in ball parks and other open areas . . . A system of room-by-room, "zoned," heating and air conditioning . . . A gas, free piston, engine to power home air conditioners . . . A gas "power center" in a home for air conditioning, air purification, refrigeration, freezing, and to power kitchen appliances.

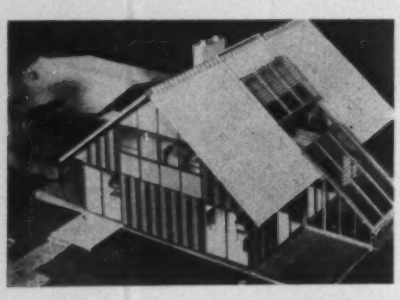
Aluminum Captures a Railroad Job

On Mar. 29, Pullman-Standard Div., Pullman Inc., Bessemer, Ala., completed a $15 million order to build 750 aluminum gondola cars for Southern Railway System. Because of their lighter weight, three aluminum cars reportedly will carry a total of 13 tons more coal than conventional steel cars, while showing a gross weight saving of 43.5 tons. They cost about $20,000 each vs. $12,500 for steel cars. Southern expects to pay off the difference in original cost at a rate of 32 to 60 per cent annually. Industry sources say more aluminum cars will be built in the near future; it's rumored that an order for 2100 cars is planned.

Wabush Ore to Be Shipped This Fall

Iron ore from the Wabush Lake development in Newfoundland will be tested under blast furnace conditions late this summer or this fall—as soon as rail facilities are completed, A. S. Glossbrenner, president, Youngstown Sheet & Tube Co., revealed last week. The ore, being developed by six companies, "can easily be concentrated into a product containing better than 60 per cent iron," he said.

Yes, It's a Porcelain Enamel House



This is a scale model of a house being erected near Cleveland. The roof, all exterior walls, and the interior walls in the kitchen, bath, and utility areas will be finished in porcelain enamel. More than 20 firms are participating in this research project sponsored by Ferro Corp.

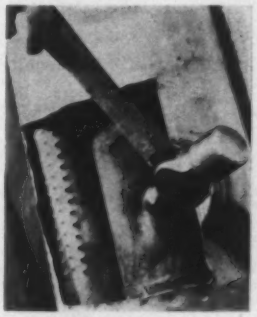
Detroit Engineer Looks to Aluminum, Plastics

Interest in plastics among automakers is being spurred by a trend toward lower original cost at a time when metals show an indication to swing higher in price, says M. F. Garwood, chief engineer, Materials Laboratories, Chrysler

Corp. He also points out that the average 1960 Chrysler Corp. car uses 65 lb of aluminum in 52 parts—replacing 250 lb of iron and steel. He says an aluminum transmission case and converter housing weighs 21 lb vs. 90 lb if it were made of iron.

Chromallizing Promises Lifetime Auto Mufflers

The muffler being tortured in the picture has withstood four years of exposure to northeastern U. S. road conditions—but fails to crack under the hammer. Chromalloy Corp., White Plains, N. Y., says the reason is Chromallizing—a technique for diffusing chromium and other metals into the surface of mild steel, giving it good heat and corrosion resistance. Several muffler makers are evaluating the process; units would cost more than the conventional aluminized steel models but last longer.



Kaiser Aluminum Shoots for More Building Business

On Apr. 21, Kaiser Aluminum & Chemical Corp. will open a building products service center on Cleveland's Public Square. Later this year, the firm will open a like center in Kansas City. Aiming at a share of the burgeoning construction market, the firm will offer classes for builders and homeowners, tips on building and decorating with aluminum, information on new aluminum building products. Reynolds Metals Co. is setting up 18 service centers to cater to the same market (STEEL, Apr. 4, p. 82).

Weird Device Helps Train the Astronauts

This contraption is called a "multiple axis space test inertia facility" by its developers at Lewis Research Center of the National Aeronautics & Space Administration, Cleveland. The three gimbal cages (made of tubing) are moved (by emitting nitrogen gas from the little reaction motors in the corners) to simulate yaw, roll, and pitch. An astronaut is seated in the middle.

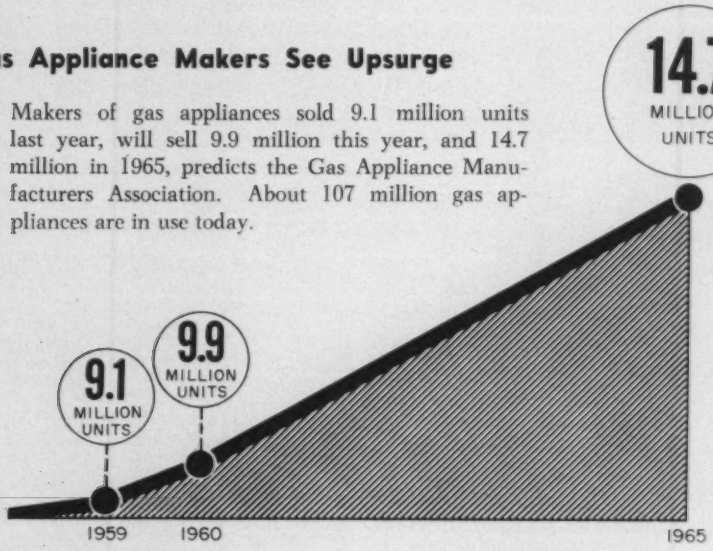
Electric Home Heating—Billion Dollar Market

The electric heating market will soon reach $1 billion annually, predicts the National Electric Manufacturers Association. The industry has set a goal of 6 million homes for the end of the decade; 850,000 homes are electrically heated today (vs. 100,000 in 1950). NEMA's C. F. Kreiser asserts that electric heating will be built into all new homes in the 1970s. Today, homeowners have $23 million invested in supplementary electric

heating units. That figure will hit $72 million by 1965 and $191 million by 1970, believes Mr. Kreiser.

Gas Appliance Makers See Upsurge

Makers of gas appliances sold 9.1 million units last year, will sell 9.9 million this year, and 14.7 million in 1965, predicts the Gas Appliance Manufacturers Association. About 107 million gas appliances are in use today.



Here's Where Polyethylene Is Capturing Markets

Look for polyethylene production to reach 2 billion lb annually by 1965 (vs. 1 billion last year and only 85 million in 1951), Union Carbide Plastics Co. predicts. The material's big growth areas: 1. Film—for packaging (accounts for 40 per cent of production). 2. Injection molding—toys, containers, housewares (20 per cent of production). 3. Wire and cable insulation (15 per cent). 4. Squeeze bottles (5 per cent). 5. Extrusion coating of paper, film, and foil (5 per cent). 6. Overwrapping of bread, detergent bottles.

Straws in the Wind

A. S. Glossbrenner, president, Youngstown Sheet & Tube Co., expects steel ingot output this year to hit between 115 million and 120 million tons . . . The battery industry will consume 382,000 tons of lead this year, C. H. Allen, vice president, Vitalic Battery Co., told the Lead Industries Association.

Metalworking Pulse

Steel: Ingot output continues to slip. **The Business Trend:** Further cuts in steel operations and a seasonal decline in the output of electric energy overcame a temporary upsurge in auto production and a slight increase in carloadings. Result: Another 1 point dip in STEEL's index. **Autos:** A return to normal operations at Ford Div. brought total weekly output to 150,000 units for the first time since the end of February. But a 13 per cent cut in third quarter schedules presages an early decline in the weekly rate.

- **INDUSTRIAL PRODUCTION**
  - Week ended Apr. 2 . . . . 174†
  - Year ago 167
  - Details on Page 73
- **PASSENGER CAR PRODUCTION**
  - Week ended Apr. 9 . . 150,000*
  - Year ago 133,202
  - Details on Page 70
- **INGOT PRODUCTION RATE**
  - Week ended Apr. 10 85.9%†
  - Week ago 88.7%
  - Details on Page 132

†Preliminary. *Estimated.

From a small furnace to a tall furnace Hevi-Duty helps you find the value solution to your heat treating problems

Each of the Hevi-Duty furnaces shown below delivers the value solution to a heat treating problem—the solution combining comprehensive design and industrial engineering with soundly built and tested equipment—the solution that pays off in increased production and extended economic life of equipment.

In each case, Hevi-Duty drew from its experience in solving thousands of industrial heat processing problems for all types of applications.

In each case, Hevi-Duty offered equipment from industry's most complete line of electric and fuel-fired furnaces and ovens. (Where stock designs or adaptions won't do, Hevi-Duty custom-engineers equipment—from laboratory furnaces to huge field-assembled furnaces.)

Case histories by the hundreds testify that it makes profitable sense to call in your Hevi-Duty sales engineer to help find the value solution to your heat treating problems.

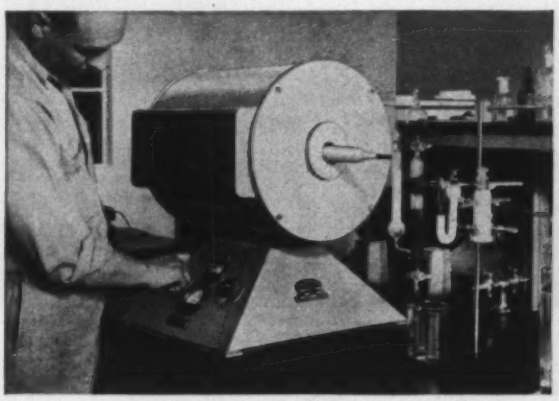
HEVI-DUTY

Electric and Fuel-Fired Industrial Furnaces and Ovens

B P C

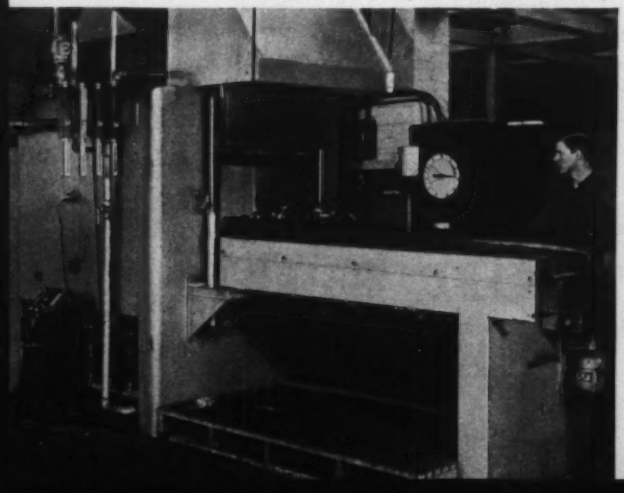
A Division of Basic Products Corporation

Hevi-Duty Electric Company, Milwaukee 1, Wis.

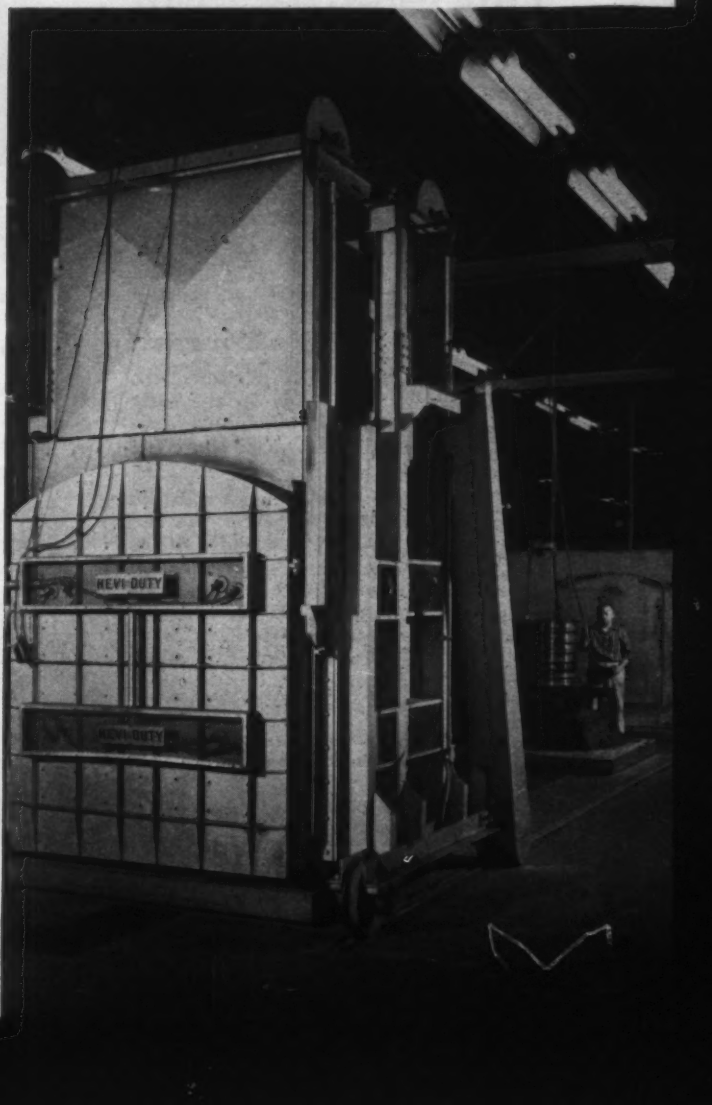


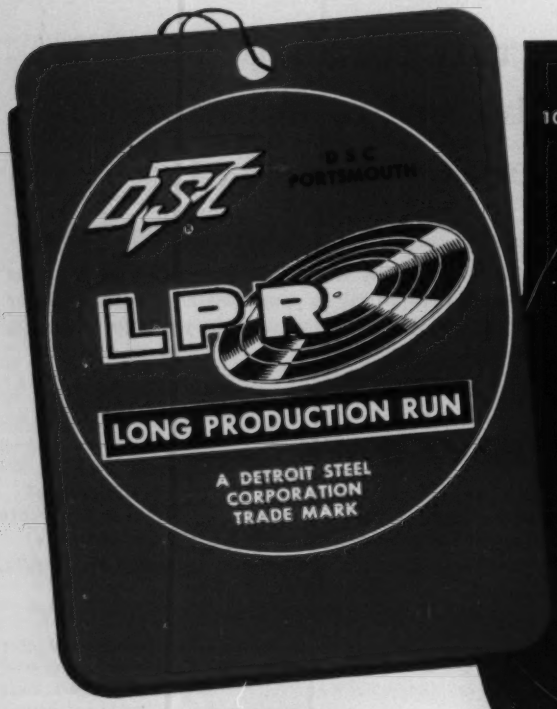
▲ *Merit Corp., Milwaukee, Wis., uses a Hevi-Duty tube furnace to maintain precise temperatures in laboratory quality tests on briquettes used by foundries as an additive to gray iron melts. Two-stage combustion operation on crushed sample burns off free carbon at 1679°F, total carbon at 2471°F.* **For more complete information, please write for Bulletin 254.**

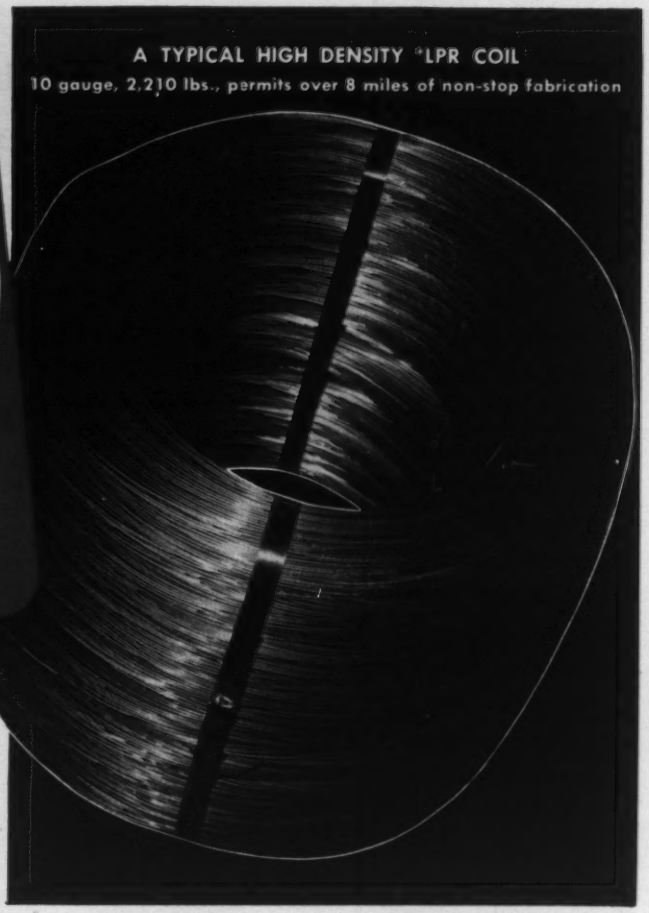
Superior Metal Treating Corp., Muncie, Ind., uses two Hevi-Duty automatic Clean-Line furnaces 24 hours a day, 5 days a week for carburizing, carbonitriding and bright hardening. Temperatures range to 1925°F. The load-transfer mechanism is outside the heating chamber, reducing equipment maintenance. **For more data, request Bulletin D-100.** ▼



This Hevi-Duty traveling, double-end, box furnace provides ±10°F control at temperatures to 1850°F for bright tempering and stress relieving stainless steel jet engine weldments. This furnace is in continuous operation. User reports brightness improves during process. Unit provides bell-furnace mobility despite lack of head room. **Please write for Bulletin 653.** ▼







This LPR Tag

on your Brite Wire coils means greater efficiency in your fabricating operations —at no added cost

Typical *LPR Savings as reported by Users (See Note)

- **Downtime frequency due to coil changes and setup adjustments cut as much as 95%.**
- **Cumulative coil-end scrap trimmed to the bone.**
- **Man-hour costs slashed (20% and more is common).**
- **Material handling time and expense substantially reduced. Unloading time alone cut from 16% to 50%.**
- **High density, self-supporting coils release 15% to 20% of storage space for more productive uses, improve inventory management.**
- **Machine productivity increased . . . for example, 1 man now operates 4 machines against 3, previously.**
- **"Returnable-carrier" problem and small storage racks eliminated.**

NOTE—Savings and improvements cited were experienced following switch from traditional mill weight bundles (150 pounds to 400 pounds).

Look Into *LPR's Yourself

Our Portsmouth Division pioneered the development of *LPR coils in the early 1950's. PURPOSE—to improve efficiency and reduce costs in our own Welded Wire Fabric operations.

We'll gladly share our experience with you if you're a Brite Wire fabricator. We also invite you to visit our Portsmouth Mill to see for yourself how *LPR's perform. For an appointment or for further information on any DSC products, please call your nearest DSC Customer "Rep" or write Detroit Steel Corporation Box 4308, Detroit 9, Michigan.

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Performance Proved DSC

DETROIT STEEL

Flat Rolled and Wire Products

New Role for Maintenance!

Maintenance management has become a fundamental part of production efficiency, but too often it is overlooked or neglected.

In the days of grease cup lubrication, lineshaft drives, hand lever controlled machines, and simple electrical devices, maintenance wasn't as important as it is today.

A plant's production schedule was not noticeably disrupted when a machine broke down.

So maintenance was regarded as an evil that merited attention only when it was absolutely necessary.

It was an expense that could be conveniently avoided—especially when business slowed down.

And it was a chore usually given to people who had neither the necessary talent nor the interest for the work.

Today, when one production unit breaks down, a whole line slows down or comes to a halt.

With the growth of automation in the next ten years, maintenance crews are likely to become the largest work units in many plants.

So maintenance is assuming the status of raw materials, power, and labor as an element of unit production costs.

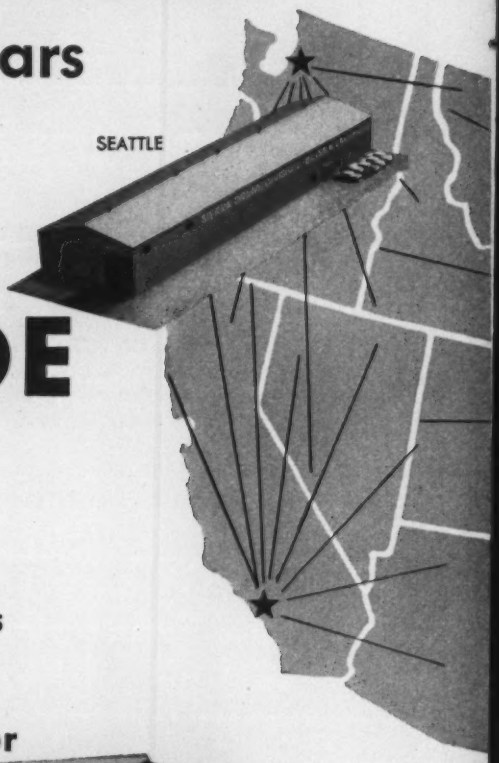
Since more attention must be given to the prevention of breakdowns, maintenance management of the future will have a hand in the design and modification of components, equipment, and systems; and the development and refinement of production processes.

Don't overlook the new role for maintenance!

Irwin H. Such

EDITOR-IN-CHIEF

The Industry's Most Complete and Most Flexible Mill Service For Cold Finished Steel Bars



NOW... NATION-WIDE

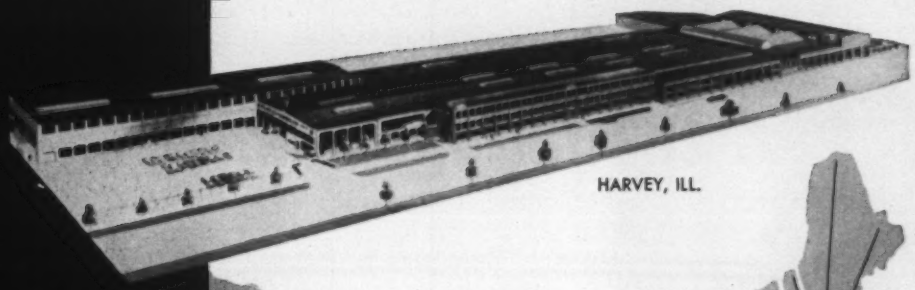
BLISS & LAUGHLIN'S new SIERRA DRAWN DIVISION adds two West Coast mills to provide a full range of cold finished steel bars for all metalworking areas

The merger of Sierra Drawn Steel Corp.'s Los Angeles and Seattle mills with Bliss & Laughlin's four midwestern and eastern mills expands Bliss & Laughlin's fast, flexible, specialized production facilities all across America.

Sierra Drawn joins Bliss & Laughlin to bring a complete line of cold finished steel bars to the growing West Coast metalworking industry. Bliss & Laughlin looks to its new Sierra Drawn Division as a respected partner in enlarging the company's present West Coast services.

This extension of Bliss & Laughlin's production skills across the nation is another step in company's seven decades of leadership in providing the industry's *most complete* and *most flexible* mill service.

Completes Another Step In Bliss & Laughlin's Nearly 70 Years of Leadership In Production Methods, Research and Service



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KALAMAZOO, MICHIGAN
LOS ANGELES, CALIFORNIA
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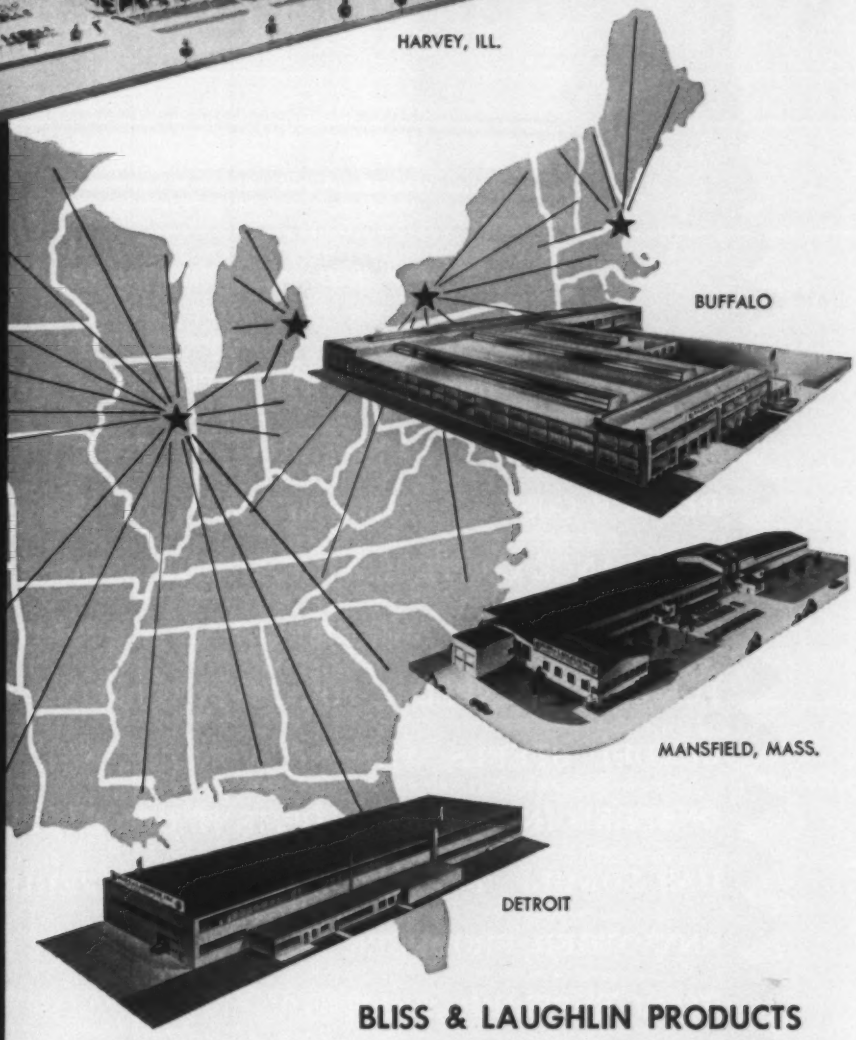

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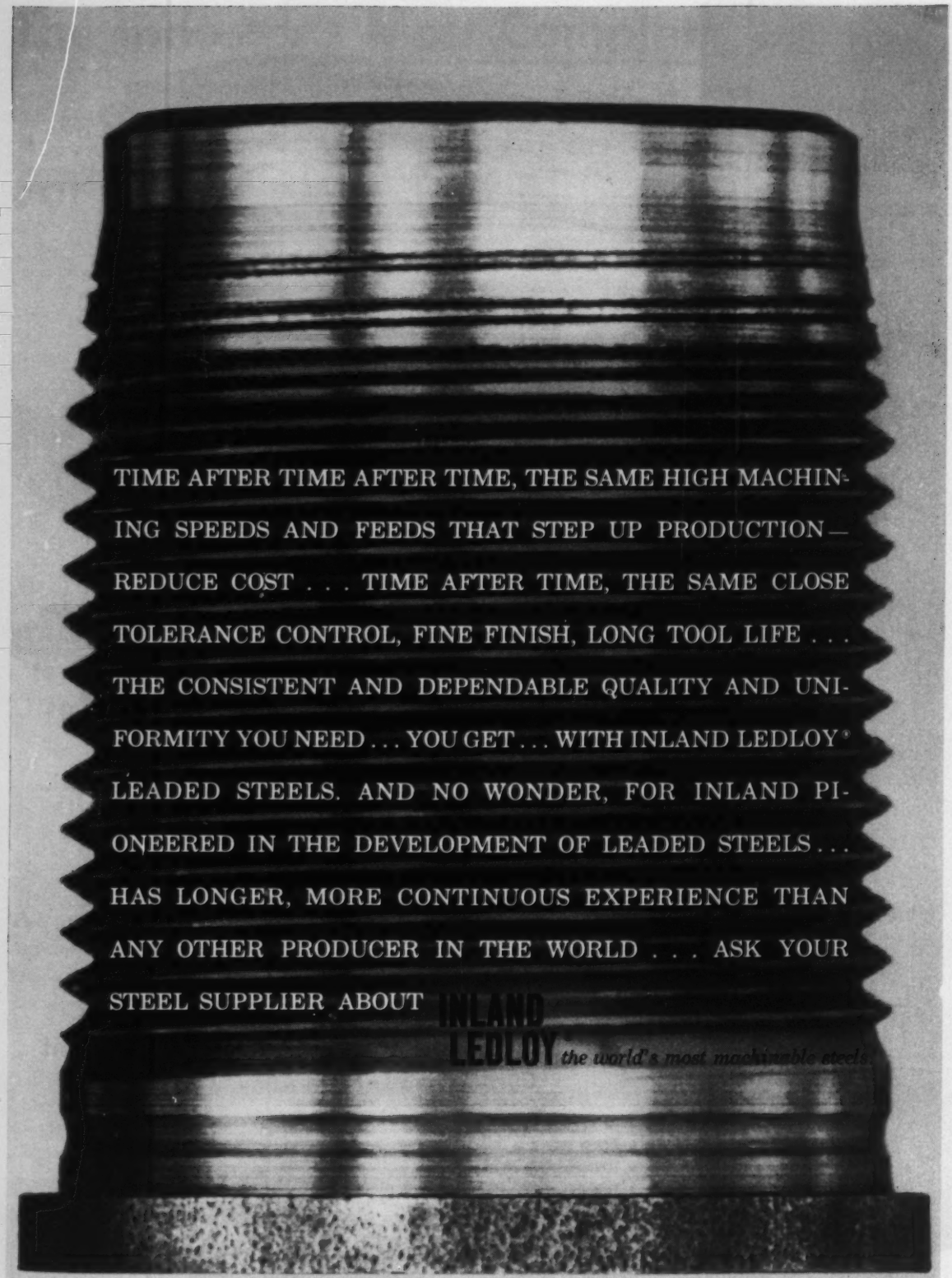
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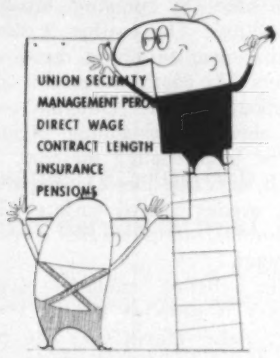
How Labor Negotiations Shape Up



- **Direct Wage Increases . . . . . 6 to 8 cents**
- **Insurance . . . . Increased benefits, with employers paying 60 to 80% of total costs**
- **Vacations . . . More pressure for three weeks after ten years' service**
- **Two-year contracts gain popularity**
- **Companies take tougher stand on work standards**
- **Unions, generally, show no disposition to strike**

METALWORKERS are driving a hard bargain in labor negotiations. New contracts are not following the basic steel settlement to the letter.

STEEL spotchecked leading metalworkers, employer associations, and labor consultants in the major cities and found these trends:

1. Direct wage increases range from 5 to 10 cents. Average: About 7 cents. Settlements in the East appear to be slightly above average. Medium and small plants in Detroit report slightly below average increases.

2. While most firms are granting increased life insurance and hospitalization benefits, the average still falls below that of the steel industry. Less than half the contracts negotiated provide for full company payment of insurance premiums—most call for 20 to 40 per cent of the cost to be contributed by the employee.

3. Pressure is mounting for three week vacations after ten years' service. Several firms report settling for 12 days' vacation after ten years and 15 days after 15 years.

4. The trend toward longer term contracts continues. "One big reason," comments Ray Vacha, director of industrial relations for Associated Industries of Cleveland, "is that contract negotiations take longer than they did ten years ago. Today's executives prefer not to go through the hassles every year.

"Another factor: Bargaining techniques. Not too long ago, the union brought its demands to the first union-management meeting and bargaining started immediately. Today, both parties submit demands at the first meeting and spend the next two meetings going over each other's lists. By the time you spend six to eight meetings to settle a contract, it really amounts to only ten months' duration."

• **Bucking the Pattern**—Negotiators appear to be having more success than they've had in the last few years in persuading unions to bargain on the merits of a company's situation rather than follow national or industry patterns. "I think the threat of foreign competition is getting through to some of them," said a Midwest industrial relations executive. "Once we convinced the union rep that we made stamped metal products, not steel, and that we compete with foreign plants and southern manufacturers, not our neighboring factories, then bargaining rolled along smoothly."

• **Work Standards**—Kenneth Porter, research director of the Employers Association of Detroit, and several company industrial relations executives noted a tendency of some firms to take stronger stands on work standards. Some negotiators think they can feel a slight loosening of union resistance in this area. "Sure they're going to buck tightening of work standards," related one bargainer, "but they're intelligent men; they can see the pressure on costs and where it's coming from;

they know job security is involved, and productivity has to be increased."

• **Public Pressure**—Public pressure is showing up in the bargaining sessions of smaller firms. Example: Pittsburgh-Des Moines Steel Co., a surburban Pittsburgh steel fabricator, got union demands paralleling those of the steel settlement. The firm had no cost of living or Supplemental Unemployment Benefit provisions in force. It was dividing the cost of insurance equally with the employees. The union wanted the firm to pick up the total cost.

Bargaining sessions broke off and a 24 week strike followed. Settlement came only after the firm announced it would have to close down because it couldn't afford the union demands and the local Chamber of Commerce and regional industrial development group began pointing up what the loss of the firm would mean. Finally, local union officials put the issue up to the workers in a secret ballot. By a vote of nearly 2 to 1, the company package, amounting to about 37 cents per hour over 43 months, was accepted.

• **Coming Talks**—The next major negotiations to watch: Those in the aircraft industry. Douglas Aircraft, which was slated to open talks last Friday, announced a 10 per cent pay cut for some 13,500 salaried employees effective today. Its contract with the Auto Workers expires May 19.

The International Association of Machinists has started talks with Boeing Airplane Co. Union officials indicate that relocation and severance pay will be major issues. "Our people have to have some protection when manufacturing contracts are as subject to sudden cancellation as they are in this industry."

• **Summary**—Most of the executives contacted by STEEL echoed the feelings of AIC's Ray Vacha: Bargaining is tougher than it was last year. The unions know some concessions have to be made to the medium and small size firms that can't afford to match major settlement patterns, but their members want to come as close as possible, arguing: "We pay the same union dues; we're not second class citizens."

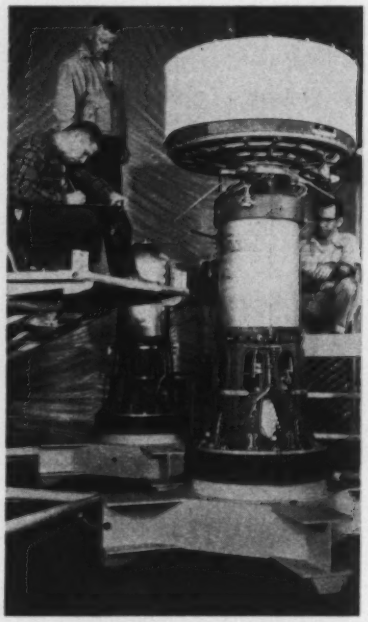
But few union members are in a mood to take a strike.

New Colors Are on the Way For Tinted Stainless Steel

COLOR-COATED stainless steel will go to market soon in a variety of new hues, promises Allegheny Ludlum Steel Corp. in announcing its new color process.

After several years of research and development, the company is ready to offer stainless in shades of brown and black, says W. B. Pierce, vice president-sales. As development work continues, the metal will become available in shades of blue, green, red, and gray. Stainless already has wide acceptance in architectural applications. Now Mr. Pierce sees even bigger uses in panels for curtain wall buildings.

The colored stainless steel is also expected to interest manufacturers of consumer products, says Mr. Pierce. He cites these potential markets: Building hardware and decorative materials, kitchen and laundry appliances, auto trim and wheel covers, serving trays, coffeemakers, refrigerator doors, acoustical tiles, and furniture.



TIROS I, televising the earth's cloud cover, will be sending back pictures from its orbit for about three months. More than 9000 solar cells covering the satellite charge nickel-cadmium batteries used for the television equipment. Payload contractor was the Astro-Electronics Products Div., Radio Corp. of America, Princeton, N. J. The National Aeronautics & Space Administration hopes its experiment will lead to a system of satellites for weather forecasting and possibly control

• **Color Process**—Allegheny Ludlum colors the stainless with a chromate base (by spraying, brushing, or rolling). The coating is similar to that used in lining metal containers. The coated material is cured at about 350° F. Different colors are obtained by adding pigments to the basic coating material. The result, says Mr. Pierce, is an attractive, evenly colored surface which is durable, abrasion and corrosion resistant.

The coating material (called Hinac) is supplied by the Heintz Div., Kelsey-Hayes Co. The process was worked out jointly by technical men at Allegheny Ludlum and Heintz.

Allegheny Ludlum claims that the process is simpler, more economical, and more effective than other methods of making black or gray coated stainless steel. It requires no unusual pretreating, no primer undercoat, and no baking at extremely high temperatures to achieve color adherence.

Aluminum Extrusion Gains

Aluminum extrusion markets have more than doubled since 1954, reports the Business & Defense Services Administration. Shipments of extruded shapes and drawn tubing jumped from 513 million lb in 1954 to 1048 million lb last year.

In the same period, the number of companies producing a vast array of shapes has grown from 85 to 129. Demand for shapes has grown the fastest. They're used in windows and doors, aircraft, buses, trucks and trailers, autos, furniture, irrigation systems, store fronts, and other structural uses.

Soft alloy shapes, produced by

all companies, were largely responsible for the 1954-59 growth. Shipments increased 141 per cent, from 385.8 million lb in 1954 to 928.1 million lb last year. Hard alloy shapes, produced by a limited number of companies, fell 26 per cent during the period.

At the beginning of the year, 361 aluminum extrusion presses were in operation—an increase of 69 per cent over the 1954 total. The biggest increase has been in smaller presses—109 of the 147 added since 1954 have been under 1500 tons in capacity.

BDSA reports that a growing number of extruders are installing auxiliary facilities, such as billet casting equipment to produce their own billets, diemaking facilities, and chemical or electrofinishing facilities.

Simple Test to Help Push Beryllium Hunt

A 5 minute field test which detects beryllium is intended to spur a nationwide hunt for the metal. Beryllium is valued at about $70 a pound. The test was developed by the Bureau of Mines.

Because beryllium is light and strong, it offers many potential advantages to designers of high speed aircraft, missiles, and space satellites. Between 1954 and 1958, consumption of beryl, the only commercial source of beryllium, increased from about 1950 tons to more that 6000 tons, the Bureau noted.

The test procedure is described in a publication, Information Circular 7946, "Field Test for Beryllium," which can be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., for 15 cents.

GSA Plans Graphite Sale

General Services Administration will dispose of about 2647 short tons of graphite from the national stockpile of critical and strategic materials. After a six month waiting period, GSA will offer an initial lot of 740 tons of graphite, including 712 tons of domestic crystalline flake and 28 tons of Ceylon amorphous lump graphite.

$1 Trillion to Go for New Construction in 1960-70

Virtually a new U. S. will have to be built within the next 40 years, and nearly $1 trillion worth of construction will be put in place during the next decade as the country starts the job of replacing all its schools, houses, offices, stores, and industrial plants. That was the consensus of 250 construction people at the recent National Construction Industry Conference, sponsored by the U. S. Chamber of Commerce, in Washington. Highlights of the meeting:

• Dr. George Cline Smith, vice president and chief economist, F. W. Dodge Corp., New York, told the group that the population will jump 34 million in the next ten years. To meet the needs of the population explosion, 15 million housing units, or 1.5 million a year, will be required by 1970.

To fulfill those requirements, new construction will have to rise to at least $65 billion annually by 1970 in constant 1960 dollars. (It's running about $55 billion now.) That means within this decade, $600 billion will go into new construction, with another $300 billion for maintenance and repair.

With the largest adult population growth in the old folks and young adult categories, an increased preference for small rental units should be noted. About 20 per cent of the new units in 1960 will be apartments. Nonresidential building is running about $13 billion annually. It should hit at least $17 billion a year by 1970 in constant 1960 dollars.

• Martin L. Bartling Jr., president, National Association of Homebuilders, said more houses will be built with components instead of pieces. Walls, partitions, trusses, and other large components will be built in factories under controlled conditions and assembled at the homesite. Foamed plastic bonded to stressed skins (which may be plywood, hardboard, aluminum, or some other material) is one of the latest developments in component construction.

• Frank C. Carr, vice president, John Nuveen & Co., Chicago, added that state and local government construction may reach $28 billion ten years hence and will total $13.25 billion this year.

• Industry leaders predict heavy engineering construction will reach $22 billion annually by 1970.

Sales trainee at Armco Div., Armco Steel Corp., presents his approach to executives who portray customers. A practice presentation may spark a real sale

Realistic Sales Training Pays Off

SALES training is paying an unusual dividend at Armco Div., Armco Steel Corp., Middletown, Ohio. Trainees make staged presentations to company executives who portray real customers and act out real situations. Some of the ideas presented have led to orders.

After a year or more experience with the firm's policies and processes, trainees work up five sales analyses which deal with actual customers and selling situations.

When a beginner turns out an effective study and convinces his fellow actors that they ought to buy, the script is sent to the field salesman who handles the account.

The presentations are designed to win business away from a competitor (see exhibit) or to open new markets for current accounts. One problem solving technique worked up by a trainee, improved a customer's product and convinced him of the possibilities for a new product line.

• **Here's how the sale was made:** The trainee, James H. Maynard Jr., built a sales presentation around a detailed analysis of a customer's line of lawn mowers and lawn material spreaders. The spreaders, in particular, were subject to rust and chemical corrosion from fertilizers and weed killers.

After learning that he was dealing with a "quality first" company with an excellent reputation, Mr. Maynard planned a campaign to sell the customer on marketing a new line of de luxe, rust resistant, stainless steel spreaders.

Mr. Maynard's presentation, backed up by a 20 page analysis of costs and problems, ranged from the correction of weld discoloration to the point-of-sale appeal of stainless merchandise. He advised that Armco could provide equipment maintenance tips to readers of the customer's news publication for home owners. He offered answers to hypothetical questions from the buyer in a sales conference. (Question: "Will it last too long, so that we don't sell enough units?" Answer: "This stainless steel unit is not intended to replace present cold

rolled steel, painted models but rather to supplement them with a higher priced, top quality line.")

• Mr. Maynard's presentation did more than earn him a high grade in his training. The district salesman who handled the account used it to land the business, and it led to the introduction of the new line by the fabricator.

All other phases of Armco's training are also customer oriented. Trainees learn as much as possible about the steel grades they'll be selling, so that they can make better estimates of customers' needs.

After studying production processes, they learn mechanical and physical properties of steels, mill limits, pricing, plus such factors as corrosion resistance, machinability, and formability. They also make comparative studies of competitive products and materials. A later phase of the program takes the trainees into all Armco Div. plants to learn scheduling and routing for special processing.

To learn sales processing, the trainees serve consecutively in the home office departments, handling orders, claims, credit, traffic and sales service. With the home office part of the program behind him, each trainee goes to a district sales office where he spends at least a year as an inside salesman, under the counsel and supervision of the district sales manager.

When he receives his first outside assignment, the new salesman has had two and a half years of intensive training to prepare him for his first call.

Trainees normally come from two sources: College campuses and the company's plants and offices. They're expected to have an educational background in liberal arts, business administration, or engineering. After taking a battery of aptitude and personality tests, they're interviewed by top sales management; each prospective salesman is rated on desire for sales, maturity, verbal expression, poise, and appearance. Selection is made by the Personnel Relations Div., with the guidance of sales management.

As the trainees complete their tours in production and sales departments, they are quizzed on the department operations. The quizzes are reviewed in discussions with superintendents and training advisers. Training is supplemented with trips to plants of customers and to Armco's plants at Baltimore, Ashland, Ky., Butler, Pa., Piqua and Zanesville, Ohio.

In his home office tour of duty, the trainee completes two final subjects. Somewhere during the training period he takes a course in business correspondence, and he joins the local Junior Chamber of Commerce to obtain early practice in being a member of the business community. He is encouraged to help in community activities wherever he is assigned.

• If you'd like to have a copy of this article, write to Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. You may win $1000 by using material like this in STEEL. For details, see the Servicenter, Pages 5 and 6.

An Idea That Led to a Sale

For several years, an Armco district salesman had been trying to sell stainless steel to a producer of bulk milk tanks. The potential customer bought its requirements from three competitors and was "well satisfied with its present suppliers."

In the home office, Armco assigned the target account to one of its trainees. A suggestion in the detailed presentation he prepared did the trick. Can you find it in this summary?

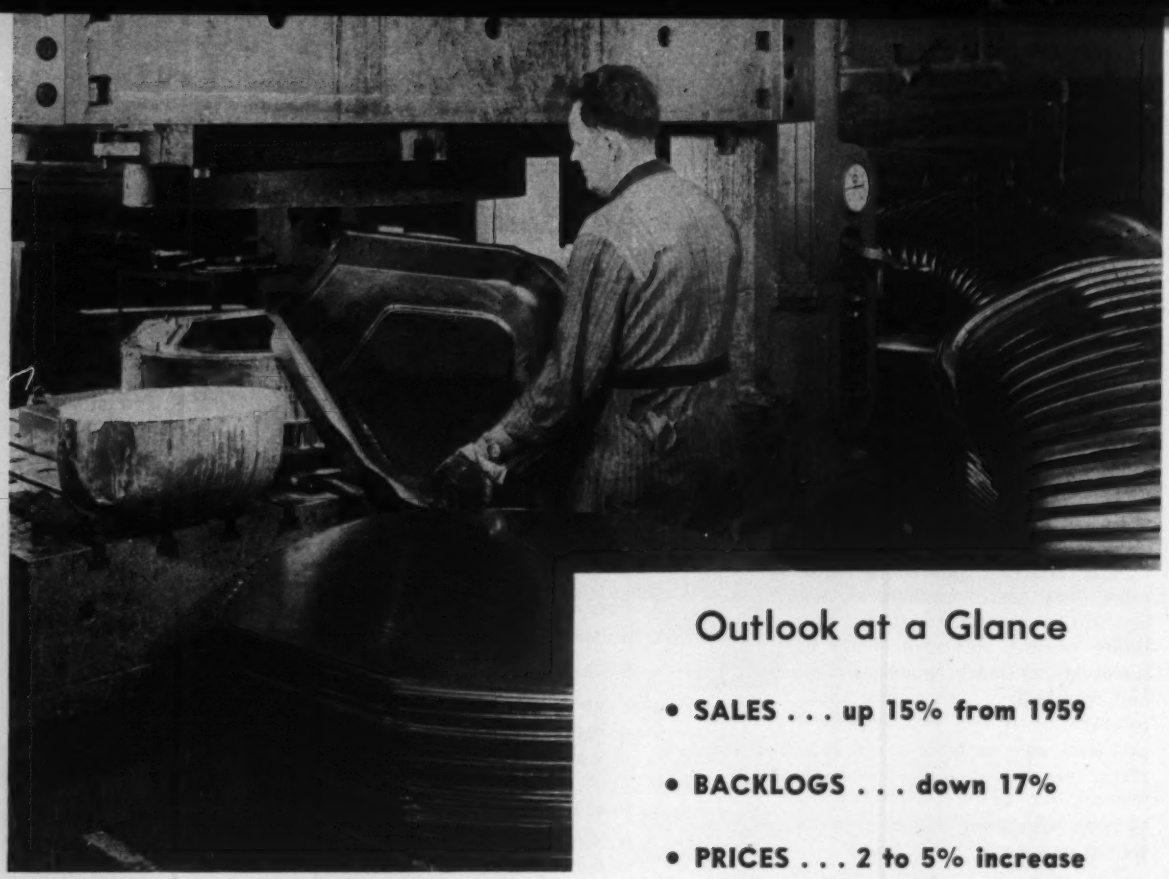
1. **Name of the firm; its principal buying influences; products manufactured; chief customers; method of distribution; financial and credit standing; principal sources of steel.**

2. **Analysis of the potential customer's product:**
   - **a. Steels used and where purchased.**
   - **b. Methods of fabrication.**
   - **c. Service conditions to which product is exposed.**
   - **d. Sales factors of the product, such as cost, strength, appearance, maintenance.**

3. **How to make the sale—Show these benefits:**
   - **a. Armco advertising, direct mail, and personal contact with county agents, extension specialists, farmers, and other buying influences.**
   - **b. Armco is a reliable source of supply—it has two fully integrated plants producing stainless steel.**
   - **c. Armco's willingness to help customers work out problems.**
   - **d. Inquiries arising from advertising are sent to Armco customers.**
   - **e. Armco produces the widest stainless steel sheets on the market. Customer may be able to make entire outer tank, except heads, from one sheet. Approach will eliminate welded seams.**

"Point 'e' in section No. 3 sparked an idea," relates the district salesman. "I had touched on the point before, but I decided to make it my major selling point on the next call. It led to the sale. The industry is famous for its needs for large, odd size sheets."

Result: Armco and its distributor got 90 per cent of the manufacturer's stainless business—worth about $700,000 a year.



Outlook at a Glance

- **SALES . . . up 15% from 1959**
- **BACKLOGS . . . down 17%**
- **PRICES . . . 2 to 5% increase**

Stampers Plot Sales, Price Gains

CONTRACT STAMPING companies, after taking a somewhat sobering second look at heady 1960 forecasts, are still confident their business will climb steadily. Revised forecasts: Increases ranging from 10 to 25 per cent in 1960 compared with last year.

Explains Bruce Krasberg, president of R. Krasberg & Sons Mfg. Co., Chicago: "Our first quarter sales were about 5 per cent under our forecast. We had figured a 15 per cent increase in 1960 business over that in 1959 at the start of the year but have lowered our estimate to 10 per cent. Our current backlog is about 20 per cent lower than last year's."

Notes Rodger S. Nestor Jr., sales manager of the Metal Stamping Div., McDowell Mfg. Co., Pittsburgh: "We expect a 25 per cent increase in sales over 1959's; however, our backlogs are about 12 per cent lower than a year ago."

For the industry, the Pressed Metal Institute estimates that shipments will equal 1957 volume, for the second best year in history.

• **Today's best stamping markets include: Heat controls, home appliances, electronic products of all kinds, oil well supplies, electrical machinery, office equipment, air conditioning equipment, business machines, and general machinery.**

Many stampers replying to STEEL's survey boast of independence of or lessening dependence on the automotive industry. They blame it and other volume markets for some of the intense competition and price cutting among stampers. The big volume buyers, say stamping company executives, shop for fractional price differences and will relocate supply work on short notice if a current supplier can't meet a competitive quotation. As a result, many stampers prefer smaller, short run contracts rather than expand capacity for repeat volume that may never come.

Stampers are responding to competitive pressures by specializing and offering a broader range of services. Many companies specialize within narrow ranges of type and size of finished stampings. One firm may contract only for relatively large, deep drawn, sheet metal parts. Another may produce only complex, miniature ones. In terms of product, the two are not competitive. Says one stamper of a noncompeting company: "We wouldn't know how to do their work and they couldn't do ours." "After all," says another executive, "being more diversified isn't just a simple mat-

ter of buying another machine—you have to be able to do the diework involved and get in enough volume to justify the outlay." Many stampers are hanging on to markets by assuming more related operations—such as deburring, plating, painting, welding, and assembling.

• Other problems facing stampers this year include customers' inventory policies, some declining markets, and imports.

Concerning some slipping markets, Schuyler Yates, vice president-sales, Toledo Stamping & Mfg. Co., says: "The economic factor that we will be most concerned about this year is the farm equipment market. Its present slump means our business will be most influenced by our passenger car and truck volume. We expect construction machinery to be fairly steady all year, neither booming nor depressed." Suppliers to the electronics market say their business will respond most to government defense policies and imports of electronic products, especially from Japan.

• Most producers anticipate price relief this year; increases will be tied to boosts in material costs.

In many cases, prices have not changed since 1957. However, virtually all of STEEL's respondents expect some kind of boost in 1960, depending on changes in metal quotations. Mr. Yates estimates: "The increases will vary because cost factors have not affected each part equally. Methods improvements have actually lowered prices in some cases. In others, price increases may be as much as 10 per cent because of tightened specifications. The average will probably be in the neighborhood of 2 per cent or less, not counting any steel increase."

• Stampers this year will also be taking a revitalized crack at new markets.

Producers will aim for new markets with what the Pressed Metal Institute terms "stacked stampings": Components that are formed with contoured stampings, fitted and fastened to replace solid, machined parts. Stampers claim the stacked pieces, shaped and pierced, will eliminate much costly machining.

U.S. Ponders Atomic Mining

WHILE world powers were arguing in Geneva over underground testing of nuclear bombs, U. S. industry was urging Congress to get started on peacetime experiments in nuclear mining.

• James Boyd, vice president-exploration, Kennecott Copper Corp., asserted that experimental work should be done while metallic ore deposits are still being economically mined by conventional methods.

He discussed commercial ore mining with atomic explosives in an appearance before the joint Congressional Committee on Atomic Energy.

He warned that the average grade of copper ores mined in the U. S. has dropped since 1900 from 2.5 per cent (50 lb of copper per ton of ore) to less than 1 per cent (about 19 lb of copper per ton). By comparison, he said, our mines compete with 30 to 40 lb ores mined in Chile and 60 to 80 lb ores in the African copper belt.

• Blasting ore deposits with nuclear devices may be the key to economical extraction of our lower grade ores, he said.

"The problem," said Mr. Boyd, "is whether or not nuclear blasts can do this more economically than conventional methods, yet safely and without contaminating or diluting the ore bodies." Atomic blasting might lead to these mining developments:

1. Breaking and removing overburden before mining an ore body.
2. Breaking ore before open pit mining begins.
3. Breaking ore and cap rock to facilitate block caving.
4. Breaking ore to permit the circulation of solutions to extract valuable minerals chemically.
5. Breaking oil shale to permit its being retorted underground.

"Some of these ideas, such as breaking ore to be handled subsequently by conventional methods, might result in a minor but important economy. Others, such as instantaneously blowing all of the overburden off a buried deposit, would be revolutionary changes," said Mr. Boyd.

• So far, however, research on nuclear mining has turned up more questions than answers, he stated.

For example, research indicates that when a crater is formed as a result of a deeply buried nuclear explosion, about 90 per cent of the material is lifted from the crater and deposited as a ridge within a distance no greater than the diameter of the crater. Even though such mining might be cheaper than present methods, said Mr. Boyd, a number of questions are still unanswered. For example, how much would it cost to clean up the crater so mining could proceed? Would the slope of crater walls be stable? Would the nuclear device create a forbidden, radioactive zone within the ore?

Mr. Boyd pointed out that the necessary research will take time, caution, and patience. Blast research, for example, will have to be done on barren rock so as not to endanger valuable deposits with contamination.

Mr. Boyd concluded: "We should make a start, however, because time has a habit of passing quickly, and ten years are not long in the history of the nation."

Argentine Firm to Get Gary Armor Plate Mill

The Gary (Ind.) armor plate mill (see STEEL, Feb. 29, p. 49) will be shipped to Argentina as the first phase of an $84 million, five year project calling for the design and construction of a rolling mill by Patterson-Emerson-Comstock Inc., Pittsburgh. Customer: Cooperativa de Provision de Industriales Metallurgicos Ltd.

On completion, the plant will have a capacity of 600,000 tons a year of cold and hot rolled sheets, skelp, and pipe.

Though not a major part of the project, the mill (capacity: 335,000 net tons of sheared plates) is the first step in establishing operations until the equipment under contract is completed and shipped. The Pittsburgh firm will dismantle, ship, and re-erect the Gary facility.

WILLIAM P. ROGERS

When Is a Merger Legal?

". . . The businessmen of the country desire something more than that the menace of legal process in these matters be made explicit and intelligible. They desire the advice, the definite guidance, and information which can be supplied by an administrative body . . ."

Woodrow Wilson, 1914

THE Justice Department, in the persons of Attorney General William P. Rogers and Antitrust Division Chief Robert A. Bicks, has mounted a white charger to do battle with large, integrated corporations that attempt to acquire independent companies in young, growing industries.

The problem the older corporations face is indicated by Woodrow Wilson's comment above: When is a merger legal? What are the criteria which make one illegal? Why can't the U. S. government, in all its wisdom, establish definite guidelines for industry to follow when it contemplates a merger?

New Cases Are Developing Fast

The latest example of Justice's campaign is the suit against Aluminum Co. of America stemming from its acquisition of Rome Cable Corp. Since the first of the year, Justice has also moved against National Steel, and the Federal Trade Commission has filed against Reynolds Metals.

In 1959, ten merger cases were filed by Justice vs. five in 1958. Mr. Bicks spells out the department's determination to protect young industries: "Vigorous enforcement of the Clayton Act's Section 7, particularly in those sectors of our economy with the greatest growth potential . . . can shape the ultimate competitive structures to avoid loss of competitive vigor through excessive concentration."

There are no hard and fast rules defining Justice's and FTC's jurisdiction. A high FTC official told STEEL that close liaison is maintained between the two agencies. Sometimes it is merely a matter of "who gets there first." Superficially, it appears that Justice tends to take heavy industry cases, while FTC worries most about consumer product lines.

Are There Guidelines to a Good Merger?

Section 7 cases are somewhat vague, says the government, because the statute "is still up in the air." In the last few years, some meaning has been established through the General Motors-Du Pont case and the Bethlehem-Youngstown decision. For example, lawyers once thought that lines of commerce could be described in terms of the metal involved. Justice and FTC now look at the product lines and even the uses of the product lines to set up barriers over which a large corporation may not venture.

The FTC official admits it is "rougher" to prove restraint of competition when two small firms merge, so, although the law is not written specifically against large corporations, it is used that way.

Two firms planning a merger can seek a prior ruling from Justice or FTC on its legality, but industry sources STEEL checked generally agreed the receipt of a promise to take no action (called a no-action letter) is almost worthless. "Times change," commented one counsel.

One general counsel suggested that the attorney general's concern about young industries has no validity within the law. "Competition is the only point," he said. He also struck out at the barriers the government is establishing against young industries: "Many times only large firms have the willingness to improve a product, to advertise it extensively, and to generally advance the industry as fast as possible."

What Does a Company Do?

A top industrial lawyer suggested: A company must thoroughly examine the product line and the section of the country affected by the merger, then attempt, in good faith, to analyze what restraints to competition or tendencies to monopoly may result. "Money itself is not a deterrent," he noted. Rather, a firm must consider percentage of the market it may tend to reach into.

He warns that the government appears more concerned about vertical mergers (between firms and their suppliers or customers) than horizontal mergers (between different industries).

One valuable criterion suggested by one of STEEL's sources: Is the industry easy to break into? If great resources are necessary, Justice and FTC tend to recognize the fact that only large firms can build the industry up.

THE TEST of Morgan Rolling Mills is in their use—and repeat orders

Republic Steel Corporation
1—24" Billet Mill
3—21" Billet Mills
2—18" Billet Mills
1—19" Billet and Sheet Bar Mill
4—18" Billet and Sheet Bar Mills
1—16" and 14" Merchant Mill
1—11" Merchant Mill
3—12" Merchant Mills
1—10" Merchant Mill
1— 8" Merchant Mill
4—10" Roughing Mills
1—10" Skelp Mill
1—18" Sheet Bar Mill
1—35" Blooming and Billet Mill
1—10" Wire Rod Mill
1—10" Merchant and Rod Mill
1—14" Strip Mill
1—22½" Sheet Bar Mill
1—11" Merchant Mill
30 Mills

United States Steel Corporation
1—24" Billet Mill
1—18" Billet Mill
1—16" Billet Mill
2—14" Billet Mills
1—10" Hoop and Cotton Tie Mill
1—13" Merchant Mill
1—11" Merchant Mill
2—10" Merchant Mills
1—18" Sheet Bar Mill
1—10" Rod and Cotton Tie Mill
1—12" Roughing Mill
1—10" Merchant and Strip Mill

National Tube Division
1—18" Skelp Mill

American Steel and Wire Division
1—18" Billet Mill
1—13" Billet Mill
1—10" Strip Mill
3—10" Rod Mills
1— 9" Wire Rod Mill
1—4-Strand Rod Mill

Columbia-Geneva Steel Division
1—10" Rod Mill

Tennessee Coal & Iron Division
1—21" Billet and Sheet Bar Mill
25 Mills

Bethlehem Steel Company
1—30" Billet Mill
1—24" Billet Mill
1—18" Billet Mill
3—18" Billet and Sheet Bar Mills
2—12" Merchant Mills
3—10" Merchant Mills
1— 8" Merchant Mill
1—12" Skelp Mill
2—10" Wire Rod Mills
2—10" Wire Rod and Merchant Mills
1—10" Wire Rod Finishing Mill
1—Wire Rod Mill
19 Mills

Jones & Laughlin Steel Corp.
1—20" and 16" Billet Mill
1—21" Billet Mill
1—18" Billet Mill
1—21" and 18" Sheet Bar Mill
1—14" Merchant Mill
1—13" Merchant Mill
1—12" Merchant Mill
1—11" Merchant Mill
1—10" Merchant Mill
1—10" Skelp Mill
2—10" Wire Rod Mills
12 Mills

Youngstown Sheet & Tube Co.
1—24" and 18" Billet and Slab Mill
1—24" and 18" Billet Mill
1—14" and 18" Merchant Mill
1—12" Merchant Mill
1— 9" Merchant Mill
1—18" Sheet Bar Mill
1—21" Sheet Bar and Skelp Mill
2—10" Skelp Mills
1—10" Wire Rod Mill
1—10" Merchant and Rod Mill
1—21" Billet and Slab Mill
12 Mills

Armco Steel Corp.
Sheffield Steel Division
1—19" Sheet Bar Mill
1—12" Roughing Mill
1—18" Billet Mill
2—10" Rod and Merchant Mills
2—12" Merchant Mills
1—10" Rod Mill
8 Mills

We picked this one page from our book

"70 YEARS of Rolling Mill Progress"

Additional pages of lists tell a further story of why you see

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on mills throughout the world.

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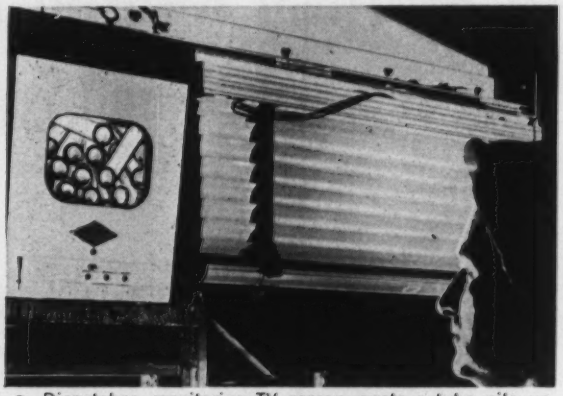
RM-84

How Diamond TV cuts costs for Timken Company

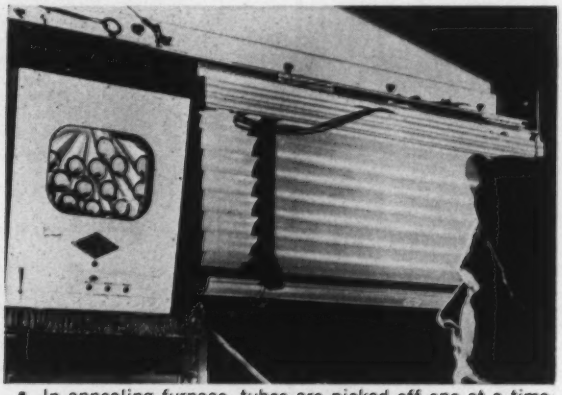
"Utiliscope"® *pays for itself in just eight months*

1 Air-cooled TV camera peers inside tube-cooling furnace, transmitting continuous picture to dispatcher in control pulpit 100 feet away. Dispatcher checks television monitor image which shows progress of tubes on walking beam conveyor — watches for pile up of tubes at conveyor exit.



2 Dispatcher, monitoring TV screen, spots a tube pile up instantly. Time lag in old method . . . hand signals from man at furnace port . . . could not have prevented piled tubes from gouging furnace refractory lining before conveyor could be stopped. Costly damage is eliminated . . . production efficiency improved!

3 With piled tubes realigned, cooling production continues with conveyor speed adjusted to prevent recurrence. Dispatcher now flips to second "Utiliscope" on adjacent annealing oven — the next step in tube production where tubes are piled cord-wood style.



4 In annealing furnace, tubes are picked off one at a time at back of furnace by powered rollers under dispatcher's control. Here, dispatcher watches for bridging of tubes which can prevent movement onto delivery conveyor. All clear here, again no spotter is required, again production flow is smoothed and protected with extreme accuracy.

In summary, one dispatcher at Timken's Canton, Ohio, Steel Mill now controls with greater overall efficiency: (1) tube mill, (2) tube cooling furnace, (3) annealing oven. Ambients at the camera location are above 125°F. Tube making is a hot process. It is in this hot spot that signalmen, formerly required, had to work. The signalmen are now working on more skilled jobs in relatively cool work areas.

Diamond's "Utiliscope" provides the metals industry the opportunity to eliminate non-productive tasks, centralize production control, reduce waste, increase employee morale, and gain new operating safety.

Our trained application engineers know the problems of providing effective trouble-free service in hot, tough, dusty locations. They are available to you as assistants in your analysis of the application of television to your open hearth, oxygen process, slab reheat, melting tables, strip mills, shears, raw materials, handling, pouring . . . or any of the other more than thirty known applications.

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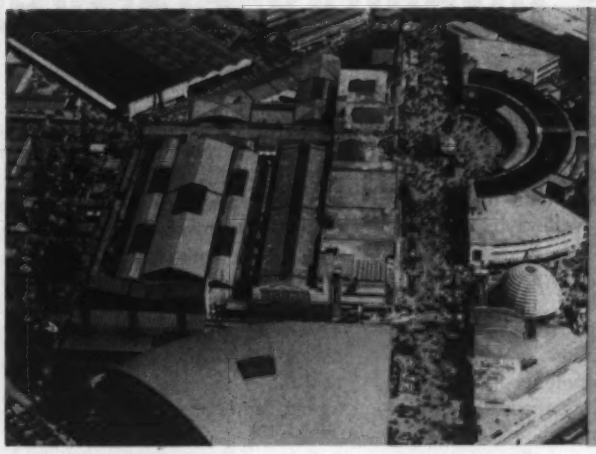


View of the Milan Trade Fair, said to be world's largest combined industrial, commercial, and agricultural exhibition

Italian Metal Output

(In thousands of tons)

	1959	1958
Steel for ingots and castings	7,433	6,898
Cast iron	2,308	2,266
Aluminum*	112	99
Zinc*	87	81
Lead*	63	62
Copper**	18	15

*Includes primary and secondary production.
**Secondary production only.

Once Bankrupt, Italy Booms

IN ADDITION to presenting more than 1 million products from 120 nations, Italy's Milan Trade Fair, which opens this week, will focus attention on the great strides made by Italian industry since the end of World War II.

In 1946, the United Nations Relief & Recovery Administration reported that the home of the old Roman Empire was bankrupt. Today, Italy has gold and dollar reserves in excess of $3.2 billion. Only two countries, the U. S. and West Germany, are better off. Credit is given to U. S. aid after the war and the stable money policy of the succeeding Italian governments.

Industrial output has been upped by more than 50 per cent since 1953. Light industry, such as business machines, motor scooters, sewing machines, and small cars, are the backbone of the prosperity. But heavy industry is also gaining. The country is the third largest steel producer in the European Coal & Steel Community, even though the peninsula has little iron and scrap and no coking coal. Capacity is now 8.2 million tons and expected to top 11 million tons by 1965.

The steel industry made its recovery from the recession in the last half of 1959. Plants were operated at 84 per cent of capacity to boost production 8 per cent over 1958's. Steel imports (about 308,000 tons) exceeded exports for the first time since 1955. An influx of low cost steel from France and the Saar explains the shift.

The nation's nonferrous output is rising. A lot of refined copper and copper alloys are imported, then fabricated for both domestic and export markets.

The over-all balance of trade showed a small deficit. But it has been offset by invisible items, such as emigrant remittances, income from tourists, and freight rates earned by Italian shipping. As a result, the Italian balance of payments was on the credit side in 1959.

The Italians are aggressively seeking world markets. Olivetti has acquired a controlling interest in Underwood Corp., a U. S. typewriter manufacturer, and is building a typewriter factory in Brazil. Italian automobiles have cracked the international auto market. Fiat and its affiliates are working on projects in Venezuela, Argentina, and Southern Rhodesia. More evidence of Italy's progress on world fronts: Oil prospecting in North Africa and bristling activity in Latin America, India, Pakistan, Japan, and behind the Iron Curtain.

Despite the great expansion, unemployment is still high. Last spring, 8.5 per cent of the work force was jobless. Automated equipment has been installed in many new facilities, and other technical advancements have cut the number of jobs faster than expected. Also, much money is reported to have gone into higher wages rather than new investments. A ten year program to provide jobs for Italy's unemployed was inaugurated in 1955 but is currently 10 to 15 per cent behind schedule.

An intensive campaign is underway to attract private industry, domestic and foreign, to the agricultural South, a region of chronic labor surpluses. Success is doubtful since electric power is costly and scarce. But the discovery of oil in Sicily and methane in Apulia may provide the impetus needed to bring economic expansion to the area. RCA International Ltd. announced last month that it would participate in a $25 million electronics manufacturing complex which will be built in the South. On a national basis, foreign investment in Italy has skyrocketed more than 2000 per cent since 1951. In the first six months of last year, the total was $126.3 million.

Aluminum Potential Cited

International markets offer one of the most important growth areas for the aluminum industry, says D. A. Rhoades, president, Kaiser Aluminum & Chemical Corp., Oakland, Calif. Per capita usage of aluminum in the U. S. is 27 pounds per year; in the United Kingdom, 9.2 lb; European Common Market, 6 lb; the balance of Free Europe, 3.6 lb; Latin America, eight-tenths of a pound.

Are Inventory Practices

MARKET observers hope that the slightly downward trend in steel buying signals a change in user practice that will tend to level out the peaks and valleys in inventory accumulation.

Consumer inventories have soared since the end of the strike (see chart). First quarter ingot production (34.7 million tons) and finished steel shipments (25 million tons) set all-time records, but consumption did not. Users chewed up about 20 million tons, adding the rest of the metal to their inventories. On Jan. 1, they had 13.5 million tons in their stockpiles. Today, they have about 18.5 million.

• **Stability Ahead?**—Inventories of 18 to 20 million tons are in the so-called "normal band," say steelmakers. That supply is equivalent to about 90 days of consumption. The big question: Will inventories stay in the reasonable range?

In the last four years (see chart), they have fluctuated wildly, hitting the normal band only when rising or falling through it. Because of strike hedging in 1956 and again last year, the ups and downs have been abnormally severe. But even if there had been no labor crises, there would almost certainly have been wide swings in the cycle. Notice how users built their stocks up to a record-equaling 26 million tons in 1957, despite assurances of labor peace for more than two years.

• **Leadtimes Crucial**—Traditionally, users have tried to maintain their inventories in days' supply closely tied to leadtimes from the mills, says Alan Greenspan, head of the New York economic consulting firm, Townsend-Greenspan & Co. In periods of capacity steel production and long leadtimes, users keep relatively high inventories; in periods of low production and short leadtimes, they hold their stocks to a minimum.

What's the result? When users try to pare inventories to meet reduced mill leadtimes, steel consumption exceeds steel production. When users complete liquidation, they begin to order steel to match consumption levels. The development lengthens delivery leadtime, forcing users to raise inventory objectives in a-cat-chasing-its-tail manner. The momentum can carry (it has in the past) steel operations to capacity levels until inventories again match delivery leadtime. At that point, the turnaround occurs. The tail chases the cat—leadtimes drop, and inventory paring sets in again.

• **Solution in Sight?** — "The only way to dampen the inventory cycle and its overwhelming effects upon steel production curves is to flatten out the vacillation in delivery times from the mills," says Mr. Greenspan. "This," he adds, "can be accomplished only by maintaining an excess of steel capacity which enables the steel industry to meet any demands upon it without stretching delivery times inordinately. If the inventory cycle is minimized, steel production will tend to be geared to consumption. With the steel operating rate falling below 90 per cent in the second quarter, leadtimes are dropping sharply and further significant inventory accumulation is being slowed. But until the steel operating rate drops below 80 per cent, there will be additional accumulation. If the historical inventory cycle were still with us, steel production would have been sustained above 90 per cent through May."

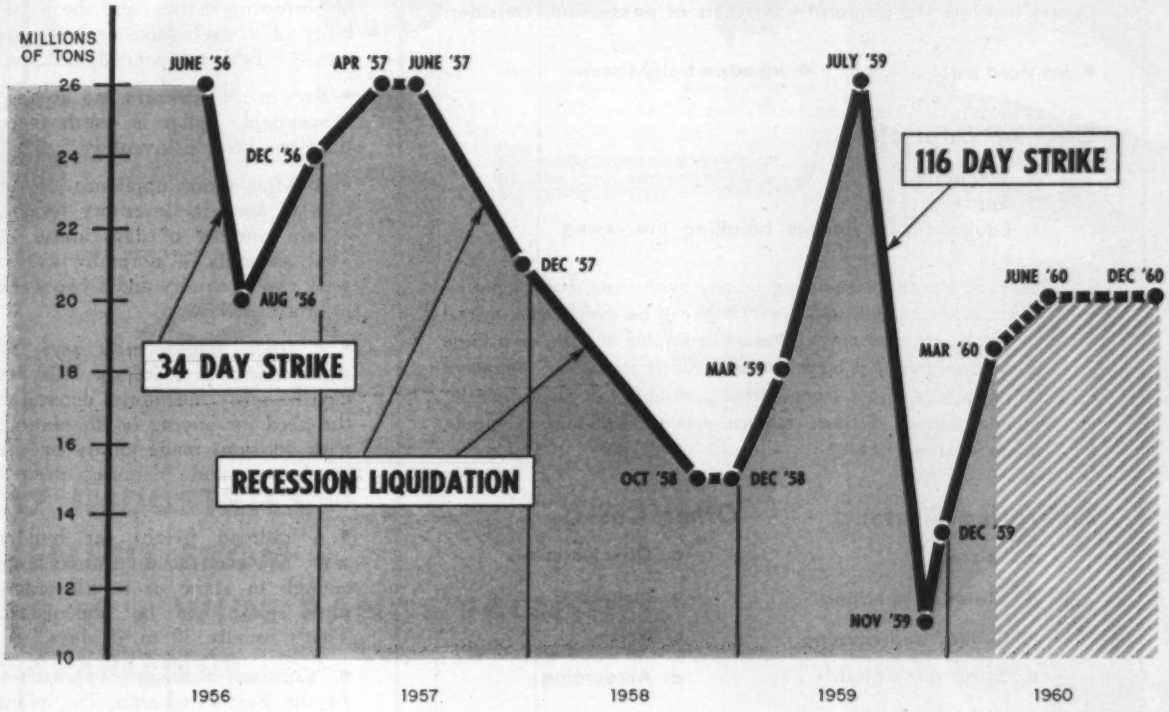
If Mr. Greenspan's theory is correct, steelmakers have a pleasant surprise in store for them: Consumers aren't going to overdo their stockpiling this time.

Leading consumers interviewed by STEEL confirm the opinion that stocks will settle in the normal band. Truck and appliance makers say their inventories a r e excellent. They'll try to cut down a little during the second quarter in anticipation of vacation shutdowns.

• **Distributors Restocked** — By the end of the week, steel service centers will bring their inventories up to a target they didn't expect to reach until midyear: 3.5 million

Changing?

How Our Steel Inventory Levels Have Whipsawed since Mid-1956



tons. Last December, their stocks were at a poststrike low of 825,000 tons. One reason for the fast build-up: Steelmakers have increased their output of the products that service centers buy (plates, shapes, bars, sheets, tubular specialties) from 68 per cent of over-all production to 72-74 per cent. They've done it because demand for other items—semi-finished steel, oil country goods, and merchant products—has been comparatively weak. And service centers, instead of buying 15 per cent of the steel industry's output, have been taking 17 or 18 per cent.

• **Inventories Near Peak**—From all indications, inventories are about as high as they're going to go. Look for steelmaking operations to average about 82 per cent of capacity this quarter—12 points under the average of the first three months. Mill shipments of about 22.5 million tons are likely. Even though automakers will assemble fewer cars in the April-June quarter than they did in the first three months (1.6 million vs. 1.9 million), total steel consumption by all industries will be higher. There will be seasonal upturns in construction, canning, oil country drilling, and railroad trackwork. Users will probably chew up about 21 million tons and add slightly more than 1 million to inventory. By June 30, stocks should level off at 20 million and change little during the rest of the year.

• **High Cost of Gyrations**—Emphasizing that wide swings of the inventory cycle are hard on everybody, Marcus J. Aurelius, administrative vice president, U. S. Steel Corp., shows how they affect consumers, producers, and the national economy:

1. Users are hurt because "excessively low inventories can mean inability to match a delivery promise of a competitor and loss of an order. Overly high inventories tie up working capital, create storage and warehouse problems, cut into profit margins."

2. Producers suffer because "swings from 50 per cent to 100 per cent are a costly way to run a steel mill. Layoffs, in addition to the harm done the man furloughed, mean higher payments for unemployment compensation. By reducing consumer income and injuring employee confidence, they can trigger a cutback in consumer spending for cars or appliances, thus further injuring both our customers and ourselves. On the other hand, when inventory building reaches a peak, production becomes more expensive; overtime payments rise; and less efficient facilities may be utilized."

3. The national welfare is prejudiced because "instability in steel output to some extent contributes to general economic instability. But even more significant is the existence of the same inventory cycles throughout manufacturing. The ex-

How to Figure Your Inventory Costs . . .

THE FULL COST of some of the steel you buy may be 15 to 40 per cent more than the invoice price, warns the Steel Service Center Institute. To pinpoint your costs of possession, consider:

- **Invoiced price per ton.**
- **Inbound freight costs.**

Cost of Capital:

a. **Inventory.**
b. **Space.**
c. **Equipment for storage, handling, processing.**

Costs of the above items are usually much more than simple interest on the capital, says the Institute. It believes simple interest should be charged only if there is a surplus of cash, or a large unused portion of a bank line of credit is available. Question: Can you invest your money more profitably in new equipment, plant expansion, product research, expansion of sales programs, or accounts receivable?

Operating Costs:

a. **Space.**[1]
b. **Material handling.**[2]
c. **Cutting and burning.**[2]
d. **Scrap generated.**[3]
e. **Waste.**

Other Costs:

a. **Obsolescence.**
b. **Insurance.**
c. **Taxes.**
d. **Accounting.**

[1]Include heat, light, maintenance, depreciation, real estate taxes, insurance on buildings and equipment, watchmen's services, and telephones. Base on square footage occupied.

[2]Include labor, power, maintenance, and depreciation.

[3]Difference between first steel price, plus cost of possession and scrap price realized.

tremes of inventory building and liquidation have been a major cause of our postwar recessions."

• **Spot Shortages Possible** — Although the steel industry has more than enough over-all capacity to meet the total requirements of the economy, marketing men point out that seasonal or simultaneous peaks in demand can cause spot shortages in two or three products while others languish. Case in point: Simultaneous peaks in demand for coils of tin plate and cold rolled sheets would overload 80 in. mills because they produce both. No difficulties are foreseen in any of the tonnage products, but it's possible that some may have strong markets. Take plates. Sales are currently depressed because pipelines and tanks are in the doldrums; freight car business is spotty; and Eastern shipyards have been on strike. But if the Pacific Gas & Electric Co.'s vast West Coast pipeline project were started, there would be an immediate need for 700,000 tons of plates.

• **Inventory Factors** — Although leadtimes strongly influence steel buyers to raise or lower inventories, they also lean heavily on sales forecasts. In addition, they consider the size of customer inventories, the cost of borrowing money, and the possibility of a steel strike or price increase. Few recommend hedging.

• Says one: "It doesn't pay because a spendable dollar is worth more than one held in inventory."

• A Midwestern appliance maker tries to keep its inventory level a certain number of days ahead of final assembly — normally a two week raw inventory and a two week in-process inventory.

• A truck manufacturer says his stock control is based on bills per day. Monthly inventories determine the need for buying or liquidation, with decisions made jointly by the purchasing and planning departments.

• A railroad freight car builder says: "We keep our inventories large enough to allow us to fill orders until stocks can be replenished. That's usually 30 to 45 days."

• **"Constant Tonnage" Approach**— At the East Pittsburgh, Pa., plant of Westinghouse Electric Corp., experience has shown the futility of measuring inventory in terms of "X" months' supply at the current consumption rate. With the booking of a few new orders for generators, consumption can suddenly double, reducing a ten month supply to five. Frequently, it happens at the most inopportune time, when plates are hard to get. Solution: Merrill Marsh and William C. Meyer, purchasing executives, totaled their purchases over a ten year period and divided the tonnage by 120. That gave them an average monthly consumption figure, which they've adopted as a constant inventory. (It has a built-in cushion against sudden changes in the usage rate.) Messrs. Marsh and Meyer maintain their inventory by ordering for delivery next month whatever tonnage they consumed the month before.

• If you'd like to have a copy of this article, write to Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. You may win $1000 by using material like this in STEEL. For details, see the Servicenter, Pages 5 and 6.

37 INDUSTRIES BENEFIT FROM T & W's WIDE RANGE FACILITIES, EXPERIENCE

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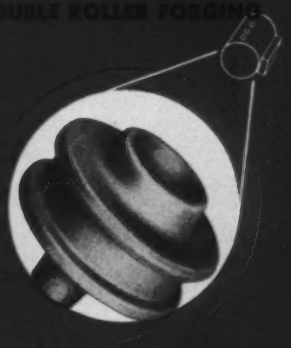

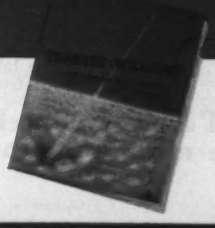

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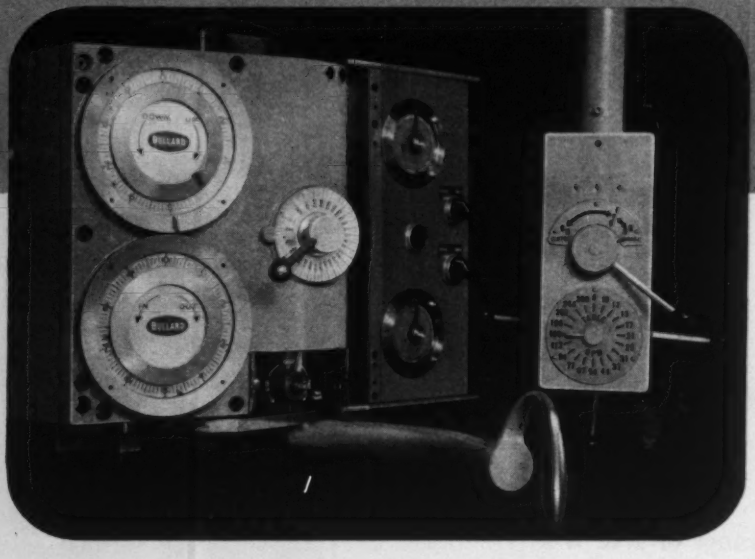

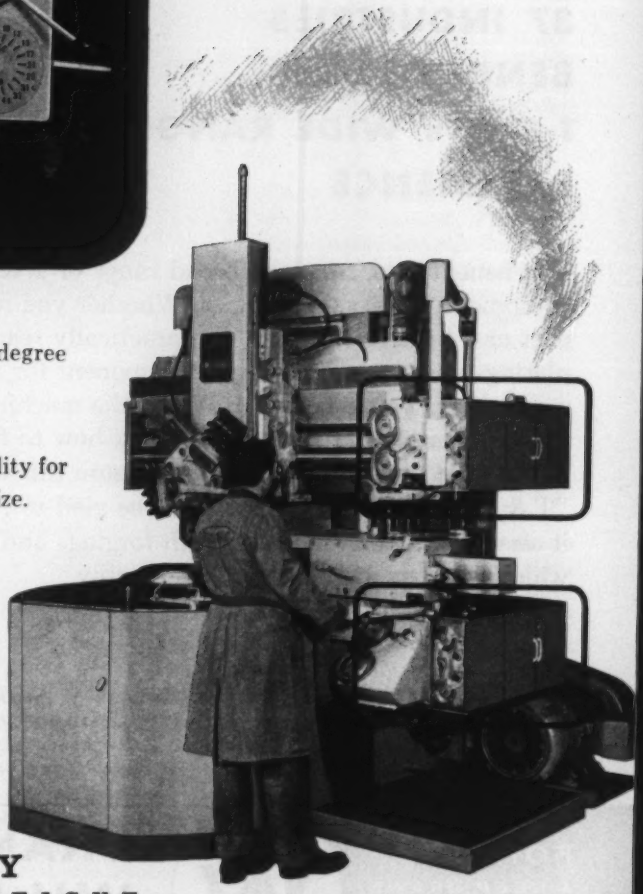

Size-Au-Trol* provides precise tool positioning control to a degree unobtainable with other vertical turret lathes.

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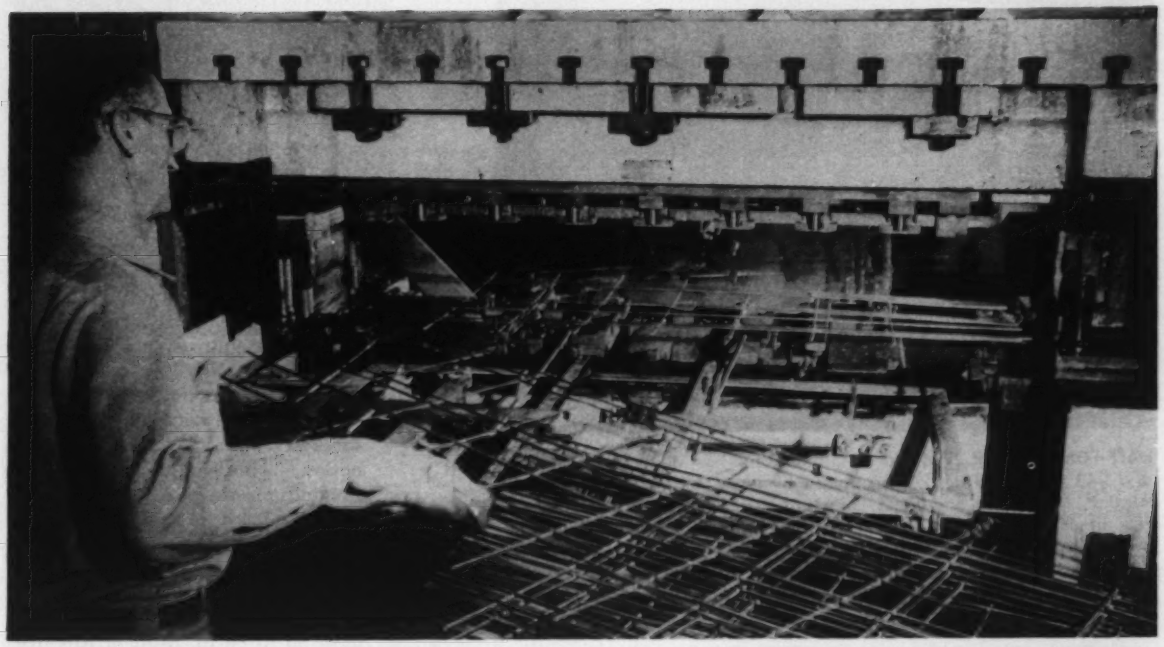
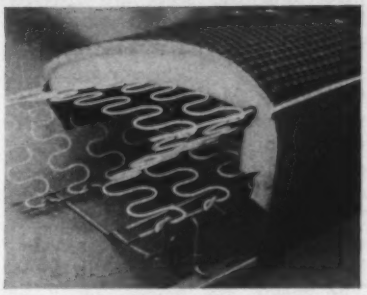


WIRE MATS are welded and run through several stamping presses that form them into rear seat and back frames. They are sprung up and covered in Fisher Body assembly plants



Fisher 'Stamps' Wire Frames

WIRE SEAT FRAMES for General Motors cars are stamped into shape from wire mats at Fisher Body Div.'s Cleveland stamping plant. Other bodymakers preform the wire first and then locate each wire in a complicated welding fixture. Some 5 to 8 lb of wire are used in each frame.

Only rear seat cushion and back frames are wire formed, explains Jack Ogden, senior engineer, Fisher Body process development staff. Front seat frames are fabricated from steel stampings because of structural considerations resulting from the fact that the front seat must be adjustable. The manufacturing process involves multispot, resistance, press welders and conventional stamping presses. Mechanical handling equipment transfers parts between operations.

• **Wire Is Welded**—Cold finished wire in No. 4 and 6 gages is unrolled from coils into automatic index welders like those used to weld wire fencing. The machines can make 30,000 welds per hour. Each wire blank or mat requires 65 welds. After the mat is welded, it is cut into proper blank size (about 4 x 6 ft) and the cross wires are bent to a slight sweep or curve which makes press forming easier. Then the mat is automatically transferred to press trimmers which cut out sections of the mat that aren't needed in forming the finished frame. Anchor loops for zigzag springs also are stamped into the mats at that time.

• **And Formed**—The mats then are shifted to forming presses where they are stamped into the complicated shape of a seat frame. Additional anchor and support wires are welded in after forming. Mr. Ogden explains that it's simpler to add these wires later rather than try to include them in the initial mat welding operation.

Ends of the wires are flanged to fit against a T-shaped section of 0.035 in. cold rolled strip steel that forms the base of the seat frame. The rim stock comes to the welding area in straight, prepunched sections and is curved to shape at an auxiliary station before it is fed into the welding press which joins it to the frame assembly. Finished frames are packaged and shipped to Fisher Body assembly plants where zigzag springs are snapped into

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HALF-TON GMC JR. VAN for retail delivery has a 98 in. wheelbase and 243 cu ft load area. Constructed by the GMC Truck & Coach Div., Pontiac, Mich., the body and chassis are fabricated as a single unit. The elimination of double frames permits extra payload capacity

place and the seats are covered before being assembled into automobiles.

• **Welding Methods** — Since the wires form a cross joint at each weld point, welding electrodes require little maintenance to maintain good weld strength properties, Mr. Ogden points out. The mat welders operate at 15 to 20 cycles, 5000 amperes, under 500 lb force. The welds are tension tested at 1200 lb to check weld strength. The T-frame base is ribbed so the flanged ends of the wire assembly will form a cross against it to produce a localized welding point. Class III copper alloy electrodes are used in the press welders and they're grooved to fit the crossed wires.

• **Cut Costs**—One of the advantages of the multispot press concept is that the electrode assemblies can be built up from standard parts. That reduces labor and tooling costs at model changeover time. Typical buildup is to combine units of welding force cylinders, electrode holders, transformers, clamp cylinders, and mounting blocks. They can be standard, interchangeable components.

Says Mr. Ogden: "One indication of the widespread use of these electrode assemblies is the fact that there are approximately 15,000 package type welding transformers in our plants. Some 9000 are in current production. The balance are used for model changeover and spares." A few years ago, less than 1000 of such transformers were in use in the entire automotive industry. The complete electrode assemblies produce from 20 to 140 spotwelds. Welding pressures generally are obtained hydraulically, although some spring loaded and air operated cylinders are used.

GM can't reveal specific cost savings or production rates, but STEEL estimates savings are in excess of 20 per cent when compared with the cost of welding preformed wires. Production capacity is estimated at 450 units per hour.

More Cold Rolled in Use

Unitized bodies are causing carbuilders to shift their steel requirements slightly from hot rolled to more cold rolled materials. That permits the use of lighter gages. It's also possible because unit bodies require less internal bracing and have a greater amount of exposed body surface which demands cold rolled for proper finishing.

Although it's difficult to pin down specific quantities, a survey of material lists shows that five years ago about 35 per cent of the flat rolled steels in the average car were hot rolled. The other 65 per cent were cold rolled. Now the ratio appears to be shifting toward a 20/80 split for builders who have scrapped the frame and body construction method.

A few years ago, a standard Plymouth contained an average of 620 lb of hot rolled sheets and strip; 1115 lb of cold rolled steel. Today's Plymouth with a unitized body contains 371 lb of hot rolled compared with 1242 lb of cold rolled on an estimated basis. The ratio for Ford's Falcon, also unitized, is about 25/75. For Corvair, it's 15/85. About 40 per cent of the cold rolled steel is 20 gage, 30 per cent is 19 gage, and the rest covers a variety of thicknesses. Hot rolled specifications range from 7 to 13 gage.

As the compact cars increase, automakers can cut down on maximum gage widths. Several cases have been reported where maximum cold rolled widths have been cut from 90 to 84 in. Most of this steel is purchased in 48 to 60 in. and 60 to 72 in. width ranges, although practices vary among the companies. Fisher Body, for example, buys most of its hot rolled steel in 38 to 48 in. widths with a maximum of 60 in. Cold rolled runs to 76 in. maximum, but most of it comes in the 48 to 58 in. range.

U. S. Auto Output

Passenger Only

	1960	1959
January	688,731	545,757
February	659,323	478,484
March	652,518	576,085
3 Mo. Totals	2,000,572	1,600,326
April		578,825
May		546,817
June		557,994
July		555,418
August		239,152
September		258,157
October		507,530
November		254,527
December		494,931
Total		5,593,677

Week Ended	1960	1959
Mar. 5	138,513	133,540
Mar. 12	145,967	134,283
Mar. 19	145,852	135,466
Mar. 26	137,385	121,832
Apr. 2	150,555†	133,878
Apr. 9	150,000*	133,202

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

Ed Weiner, president, talks with Ed Lebowitz, right, Chesterfield's superintendent, by one of the firm's three Wean Equipment slitting lines.

Chesterfield Steel relies on speed, accuracy, durability of Wean coil processing lines

Fast delivery—when, where, and how the customer wants it—is the metal warehouse's stock-in-trade. And Ed Weiner, president of Cleveland's Chesterfield Steel Service Co., is proud of the firm's record for on-time, "on-spec" deliveries of strip and sheet steel, nonferrous and coated metals.

To maintain this reputation for service, Chesterfield needs equipment that will maintain its accuracy under tough, 3-shift, week-long operation. That's why this progressive firm has installed three Wean slitting lines and the 52″ Wean flying shear line shown below . . . and is ordering another flying shear line for 60″ wide strip. Most of the firm's orders for sheet material pass through this coil processing equipment, making both speed and reliability of operation vital. Mr. Weiner notes that the Wean 52″ flying shear line has doubled sheet production over other types of lines previously used by Chesterfield.

Like Chesterfield, Wean has established a reputation as one of the most knowledgeable firms in the field of coil processing and has built equipment that is now serving many of the country's largest metalworking firms. Write for a brochure covering the important savings *you* can realize from coil processing.

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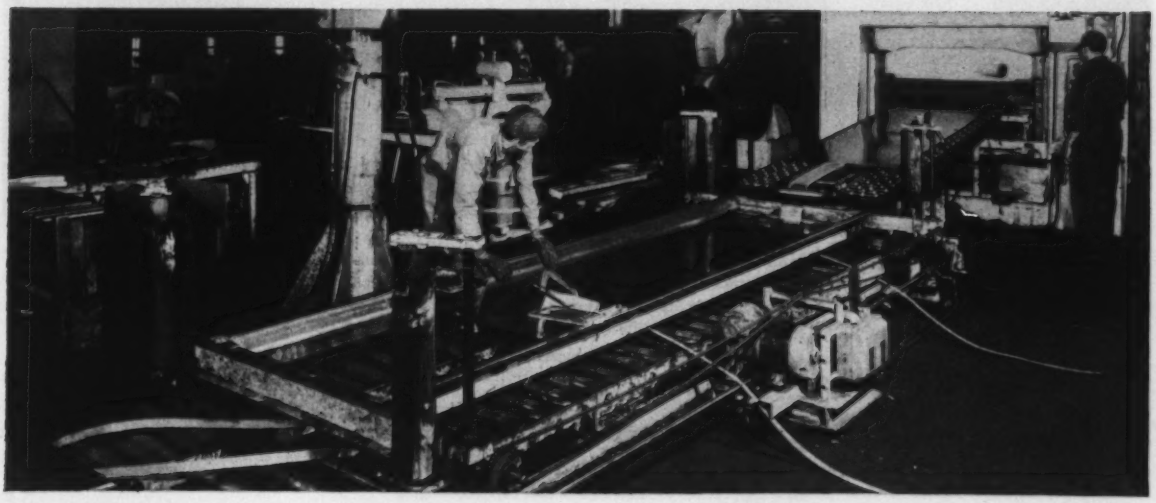
Wean flying shear line has elevating run-out conveyor and side guides which adapt to pack height.



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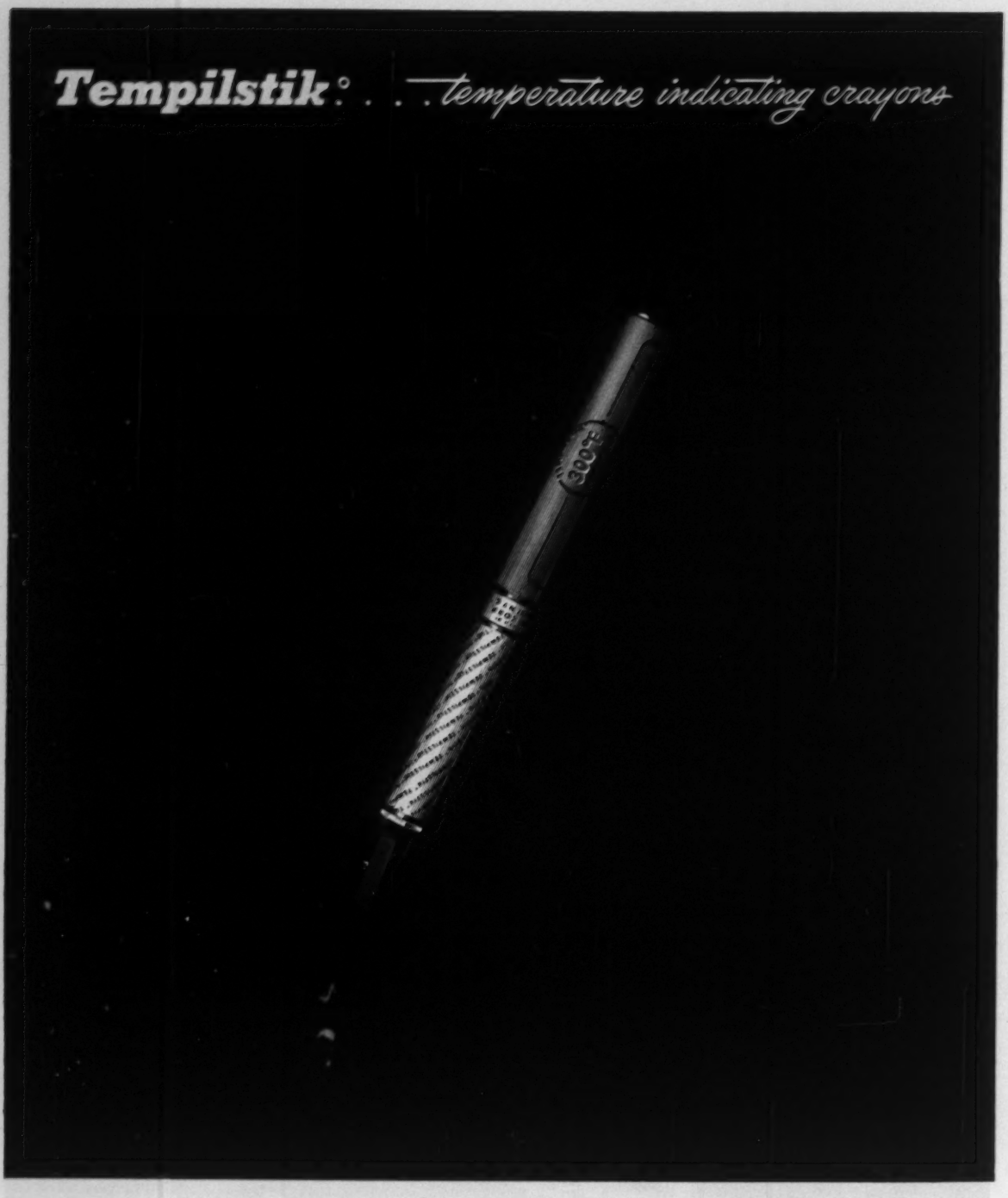

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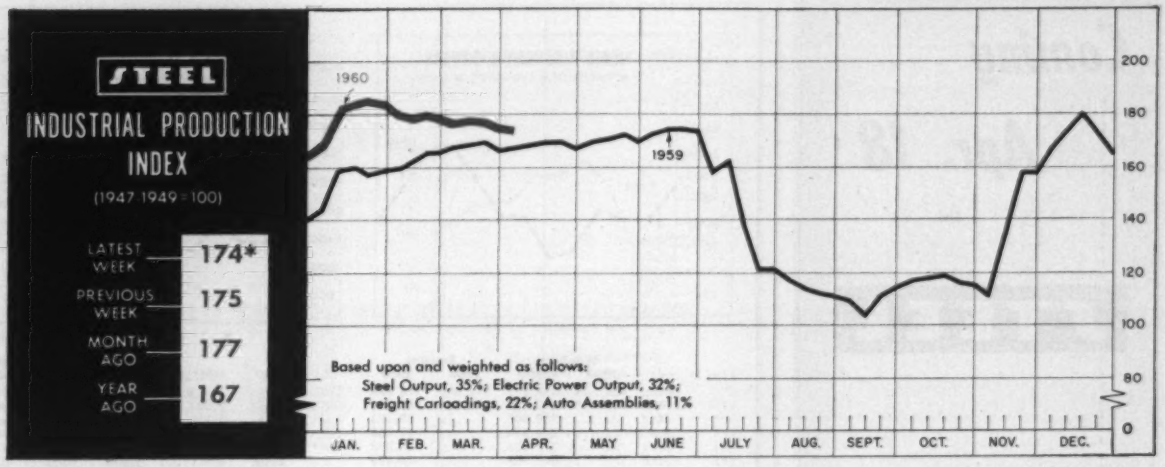

STEEL
INDUSTRIAL PRODUCTION INDEX
(1947-1949=100)
LATEST WEEK 174*
PREVIOUS WEEK 175
MONTH AGO 177
YEAR AGO 167
1960
1959
Based upon and weighted as follows:
Steel Output, 35%; Electric Power Output, 32%;
Freight Carloadings, 22%; Auto Assemblies, 11%
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
200 180 160 140 120 100 80 0

*Week ended Apr. 2.

Signs Point to Increased Activity

SPRING is bringing signs of better business and, almost surely, a strengthening of business confidence.

Railroads and ship lines are readying for renewed activity; auto dealers are getting set to launch their traditionally heavy selling season; retailers are bracing for the late Easter rush; producers of consumer durable goods are jamming their supply lines; and manufacturers see the latest statistics on sales and new orders as an omen of good production in the second quarter.

• **Boats Underway** — One of the surest signs of increased activity is the smoke curling up from the stacks of ore boats in Great Lakes ports. With the opening of the ore shipping season, railroad freight carloadings will show the effects of greater ore and coal movement. The 13 Regional Shippers Advisory Boards of the Association of American Railroads have forecast an increase in revenue freight carloadings of 0.5 per cent during the second quarter compared with the year-ago period. (The second quarter was the best period in 1959.)

• **Spring Contests Blossom**—In the auto business, you can be sure the spring rush is on when the producers start announcing sales contests. This week, at least two more (Buick and Rambler) were disclosed, and more are expected. Dealers are well supplied. At last count, they had about 1.1 million new cars on hand, or in transit. Despite cutbacks in production schedules (the second quarter is scheduled to be 13 per cent under the first), inventories probably will move even higher before they start down. With 1,731,500 units set for second quarter assembly, the first half will be second only to the similar period of record 1957, declares *Ward's Automotive Reports*.

• **Equalizer Is Near**—One reason some businessmen have become less

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,457[1]	2,527	2,641
Electric Power Distributed (million kw-hr)	13,800[1]	13,951	12,618
Bituminous Coal Output (1000 tons)	8,715[1]	8,720	8,121
Crude Oil Production (daily avg—1000 bbl)	7,100[1]	7,078	7,129
Construction Volume (*ENR*—millions)	$383.7	$453.5	$338.3
Auto, Truck Output, U. S., Canada (*Ward's*)	189,843[1]	176,185	169,727
TRADE			
Freight Carloadings (1000 Cars)	600[1]	601	590
Intercity Truck Tonnage (changes from year ago)	−1.4%	−1.3%	+14.0%
Business Failures (Dun & Bradstreet)	286	302	297
Currency in Circulation (millions)[3]	$31,534	$31,671	$31,229
Dept. Store Sales (changes from year ago)[3]	−7%	−6%	+16%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$24,501	$27,169	$21,869
Federal Gross Debt (billions)	$287.0	$289.1	$282.0
Bond Volume, NYSE (millions)	$26.8	$26.3	$32.0
Stocks Sales, NYSE (thousands of shares)	12,208	13,594	15,642
Loans and Investments (billions)[4]	$101.5	$102.2	$101.3
U. S. Govt. Obligations Held (billions)[4]	$24.8	$25.1	$31.9
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	230.9	231.0	219.3
All Commodities[7]	120.1	120.1	119.5
Commodities Other than Farm & Foods[7]	128.8	128.7	127.9

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,844,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1926-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

Coming

Apr. 18

IN

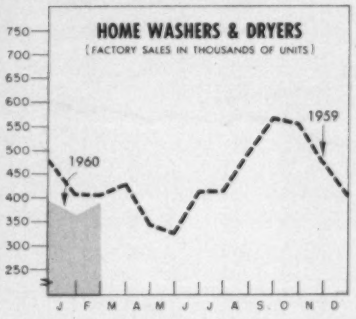
STEEL

Tool Steelmakers Shoot for New Markets

. . . new markets that are developing because of exciting new nontooling uses for tool and die steels.

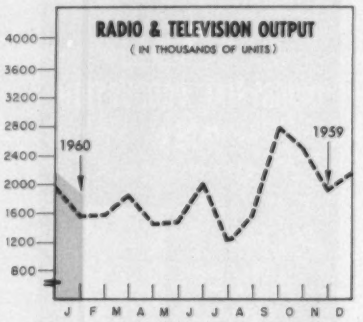
To get ideas on how these steels might help solve some of your material problems, see the 16 page, special study—Trends in Metals—in STEEL next week.

THE BUSINESS TREND



	Washers		Dryers	
	1960	1959	1960	1959
Jan.	254,565	288,491	111,603	118,220
Feb.	283,640	297,826	108,367	106,274
Mar.	.....	329,668	.....	98,434
Apr.	.....	274,372	.....	67,752
May	.....	277,934	.....	45,903
June	.....	341,894	.....	70,838
July	.....	318,063	.....	95,248
Aug.	.....	359,849	.....	133,197
Sept.	.....	394,112	.....	174,560
Oct.	.....	374,135	.....	179,669
Nov.	.....	312,796	.....	157,047
Dec.	.....	264,236	.....	134,633
Totals	.....	3,833,376	.....	1,381,775

American Home Laundry Mfrs. Assn.
Charts copyright, 1960, STEEL.



	Radio		Television	
	1960	1959	1960	1959
Jan. ...	1,355	1,125	526	437
Feb. ...	....	1,125	....	460
Mar. ...	....	1,345	....	494
Apr. ...	....	1,040	....	389
May ...	....	1,040	....	432
June ...	....	1,430	....	571
July ...	....	829	....	350
Aug. ...	....	1,009	....	547
Sept. ...	....	1,981	....	808
Oct. ...	....	1,796	....	707
Nov. ...	....	1,346	....	561
Dec. ...	....	1,553	....	593
Totals ..	....	15,622	....	6,349

Electronic Industries Association.

optimistic in recent weeks: Consumer buying seems to be behind the 1959 pace. But do the facts bear it out? In January and February, retail sales were well ahead of both year-ago months and the last two months of 1959. March statistics will probably reflect two factors on the down side: 1. In many of the nation's largest buying centers, March was the coldest month of the year, and the coldest March in history. 2. Last year, Easter, with its attendant rise in retail sales, came three weeks earlier than it does this year. With the final push coming this week, the sales comparisons will begin to get better.

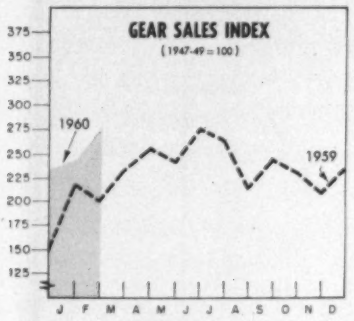
• **Consumers Still Key**—Sales figures notwithstanding, businessmen have maintained their confidence in the ability and desire of consumers to buy their goods this year. Such an outlook is readily apparent in the production figures for the appliance industry. In February, factory sales took a significant jump in most lines as the industry stuffed its pipelines in anticipation of better spring sales.

In home laundry appliances, all categories except electric dryers showed gains in February over January. (See graph and table above.) Compared with those of a year ago, unit sales in the first two months still lag by 7 per cent, but the gap is closing. In January, it was 10 per cent.

For electrical appliances, the picture is a little better. All major categories are up in February compared with January, while several (refrigerators, built-in ranges, dishwashers, and food waste disposers) show a gain for the first two months over the year-ago period. National Electrical Manufacturers Association reports that only free-standing ranges and electric storage water heaters are still behind the 1959 pace.

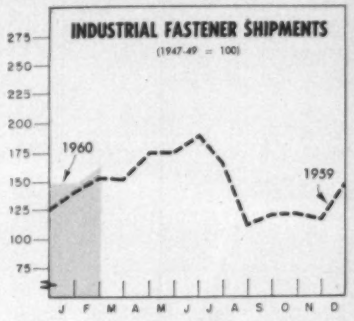
Household vacuum cleaner manufacturers watched their trend line jump above the 1959 level when they toted up 294,483 unit sales in February. For the first two months of the year, sales were 7.6 per cent above those of the corresponding period of last year, says the Vacuum Cleaner Manufacturers Association.

• **Orders Hold Hope**—Manufacturers point to the rise in February new orders as evidence that business sentiment is somewhat better than many had believed. Orders



	1960	1959	1958	1957
Jan. ...	243.4	218.6	174.5	259.3
Feb. ...	278.6	199.9	179.1	239.5
Mar. ...	....	234.3	173.7	262.4
Apr. ...	....	255.6	153.2	221.7
May ...	....	241.0	142.2	263.2
June ...	....	274.2	173.8	215.9
July ...	....	262.8	133.3	211.4
Aug. ...	....	213.3	162.1	225.8
Sept. ...	....	213.9	170.7	174.9
Oct. ...	....	230.5	175.9	207.0
Nov. ...	....	208.7	182.7	165.3
Dec. ...	....	233.9	145.5	150.8
Avg ...	....	234.7	163.9	216.4

American Gear Mfrs. Assn.



(Seasonally adjusted)

	1960	1959	1958	1957
Jan.	149	140	133	173
Feb.	164	153	117	177
Mar.	...	152	103	166
Apr.	...	175	102	157
May	...	175	111	168
June	...	187	120	162
July	...	165	133	184
Aug.	...	111	120	155
Sept.	...	119	141	159
Oct.	...	120	137	163
Nov.	...	115	134	147
Dec.	...	147	152	140
Avg	...	146	125	162

Industrial Fasteners Institute.

for durable goods rose sharply from a seasonally adjusted $14.2 billion in January to $14.8 billion in February—about equal to the December rate (when heavy inventory rebuilding caused an upturn) and the July rate (when steel orders prior to the strike pushed the figures up).

Total manufacturing sales also showed continued strength, climbing to an all-time high of $31.6 billion, seasonally adjusted. Durables accounted for more than half the increase.

Investor Sees Good Year

Two developments still seem to be bothering many businessmen: 1. The slowdown in inventory accumulation (Page 64). 2. The low level of backlogs.

Francis F. Randolph, chairman of Tri-Continental Corp., a large New York closed-end investment company, feels that there are "logical explanations for the slowdown (in inventory buildup) that do not imply a general business decline is in the making. We must remember that inflationary forces have diminished; transportation and distribution facilities have become more efficient; almost all goods are easy to get on short notice; and there is little need for most industries to incur the high cost of stockpiling supplies."

(Much of the same could be said for backlogs. With ample capacity and more efficient facilities, lead-times have shortened and forward ordering has declined.)

Mr. Randolph still believes that "1960 will be a good business year, and in the absence of extreme boom, we are less concerned about a business decline later in 1960." (That attitude is supported by the findings of STEEL's Panel of Economic Consultants, reported on pp. 91-93 of the Apr. 4 issue.)

Bellwethers Point Up

Two of the most sensitive bellwether industries also point to an active industrial scene later this year. The new order index of the American Gear Manufacturers Association jumped to 278.6 (1947-49 = 100) in February, which is the highest point since October, 1956. And the shipment index of the Industrial Fasteners Institute advanced 4 points to 164 (1947-49 = 100), seasonally adjusted. It was the best reading of this barometer since last July. (See graphs and tables above.)

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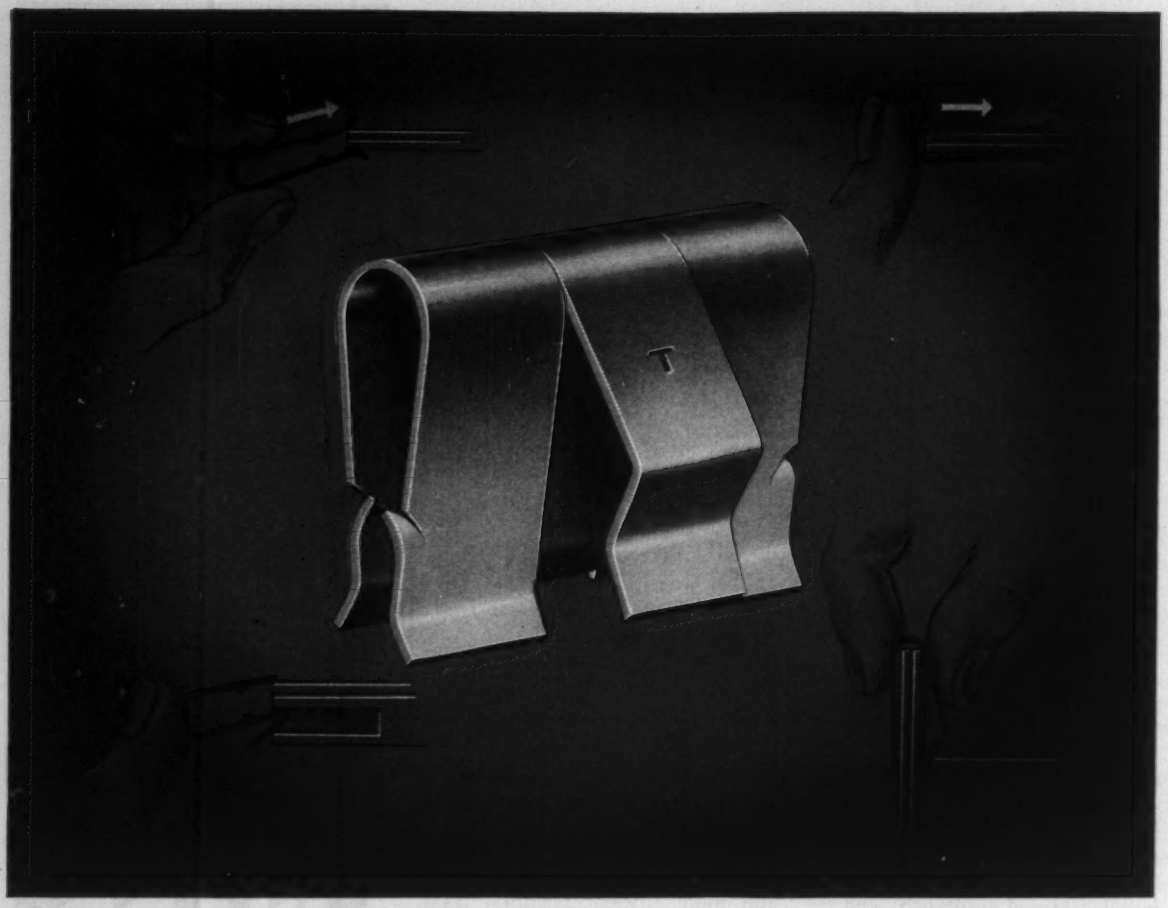

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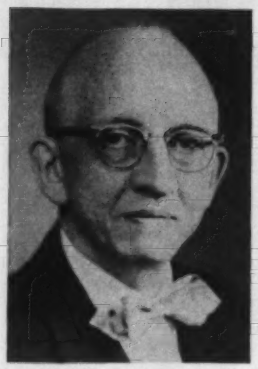
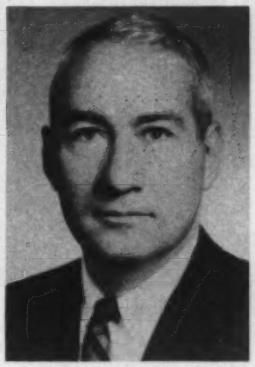


EDGAR B. SMILEY
Brad Foote Gear sales mgr.



STUART A. SMITH
Illinois Tool Wks. div. sales

W. H. KINNAIRD
Shelby Metal Products pres.

STANLEY E. CASSON
National Acme v. p.-sales

Edgar B. Smiley joined **Brad Foote Gear Works Inc.**, Chicago, as sales manager. He was a vice president and sales manager for Illinois Gear & Machine Co. **Robert J. Byerwalter** was appointed executive engineer to succeed **William F. Plume**, resigned.

Stuart A. Smith was appointed general sales manager, Tool & Instrument Div., **Illinois Tool Works**, Chicago. He was Cleveland district sales manager, Firth Sterling Inc.

Edward M. Haines fills the new post of vice president and assistant to the president of York Div., **Borg-Warner Corp.**, Chicago.

Bernard C. Yearley was appointed vice president of the newly formed General Research, Development & Engineering Div., **National Malleable & Steel Castings Co.**, Cleveland. He was assistant to the vice president.

Frank W. Hogan fills the new post of marketing manager, and **William T. Bradley** has been named field sales manager for **Adamas Carbide Corp.**, Kenilworth, N. J.

F. W. Fisher, former chief engineer-heating and air conditioning, was promoted to chief engineer for all products of the Heater Div., **Eaton Mfg. Co.**, Cleveland. **William E. Sala**, formerly chief engineer-accessories and special products, was made manager of aftermarket products. **K. E. Chilcoat** was named manager of Detroit sales for the Heater Div. **R. L. Jackson**, former sales engineer in Detroit, was promoted to assistant chief engineer.

W. H. Kinnaird, executive vice president, was elected president of **Shelby Metal Products Co.**, Shelby, Ohio. He succeeds **C. C. Fish**, elected chairman. Mr. Fish formerly served as president and chairman.

H. N. Cottingham was elected president, **Diamond Chain Co. Inc.**, Indianapolis, subsidiary of American Steel Foundries. He succeeds **G. E. Schloot**, retired. **B. K. Sollars**, vice president and factory manager, succeeds Mr. Cottingham as assistant general manager. **F. R. Gray**, production manager, succeeds Mr. Sollars as factory manager.

Walter R. Opel was made chief engineer, **Cross Co.**, Detroit. He was engineering manager.

Edgar A. Farris Jr. was appointed vice president-engineering, **Marcus Transformer Co.**, Rahway, N. J.

Tom C. Brown was made general sales manager, **White Machine Works**, Eau Claire, Wis.

Theodore R. Kennedy was made engineering assistant to the president of **Inductotherm Corp.**, Delanco, N. J. He was chief engineer of Magnethermic Corp.

Allegheny Ludlum Steel Corp. appointed **W. H. Herman** manager of its Los Angeles plant, Forging & Casting Div.

John B. Koch was made director of engineering for the Kewanee, Ill., plant of **American-Standard Industrial Div.**, American Radiator & Standard Sanitary Corp.

Stanley E. Casson, director of sales, **National Acme Co.**, Cleveland, was elected vice president-sales. He has been associated with the company 25 years, 23 of which he spent as Detroit district sales manager.

A. John Macdonald, manager of **Hanna Furnace Corp.**, Buffalo, succeeds Earl M. Doig as president. Mr. Doig continues as vice president of Great Lakes Steel Corp., Detroit. Both companies are subsidiaries of National Steel Corp.

Henry Morgan was elected president and general manager, **Electronic Controls Inc.**, Stamford, Conn.

Robert M. Caldwell was made manager of engineering, **Aluminum Extrusions Inc.**, Charlotte, Mich.

Frederick C. Stebbins was made assistant to the vice president and general manager, **Vulcan-Kidd Steel Div.**, Aliquippa, Pa., H. K. Porter Company Inc.

Ben Berk was named chief engineer of **August W. Holmberg & Co. Inc.**, Flushing, N. Y.

Wallace A. Shelby Jr. was made assistant to the vice president-engineering of **National Steel Corp.**, Pittsburgh.

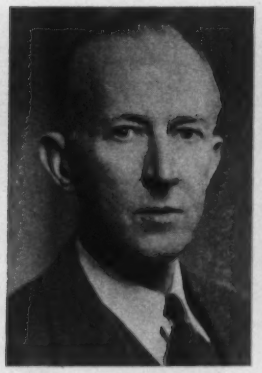
Henry C. Fechtmeyer was named a vice president of **Ampco Metal Inc.**, Milwaukee.

John W. Raisbeck was made assistant to the president of **American Motors Corp.**, Detroit. He is re-

ALBERT J. PRIMOSIC

WALTER T. FAIRCHILD

Vanadium Corp. of America posts



JOHN L. YOUNG

J. D. ROLLINS

United States Steel appointments

sponsible for financial planning-and pricing policies.

Albert J. Primosic was appointed manager of operations, **Keokuk Electro-Metals Co.**, Keokuk, Iowa, division of **Vanadium Corp. of America**. He is succeeded as manager of Vanadium's Niagara Falls, N. Y., plant by **Walter T. Fairchild**, named acting plant manager.

J. E. Romer was made manager, western sales for **Bliss & Laughlin Inc.**, at Chicago. He is replaced as Eastern sales manager, Buffalo, by **R. W. Ramage**.

Herbert A. Pakrul was made vice president and general manager, **Atlas Titanium Ltd.**, Welland, Ont. He joined the parent company, Atlas Steels Ltd., in 1941. He was made manager of Atlas Titanium in 1958.

Miles R. Glaser was promoted from Southwest regional sales manager to vice president of **Ferro Union Corp.**, Houston.

John L. Young was appointed vice president - engineering technology, **United States Steel Corp.**, Pittsburgh. In this new post, he is concerned with foreign and domestic engineering developments. Appropriations activities previously directed by Mr. Young are consolidated under **J. D. Rollins**, whose title is changed to vice president-facility planning and appropriations.

A. F. Beale Jr. was made director of research for **Dowell Div.**, Tulsa, Okla., Dow Chemical Corp. He succeeds **Dr. W. W. Love**, now research consultant.

Willard W. Brown was elected vice president-Bearing Group of **Clevite Corp.**, Cleveland, in charge of the corporation's bearing manufacturing divisions. He was head of Cleveland Graphite Bronze Div.

Edwin R. Smith Jr. was elected president and treasurer of **Seneca Falls Machine Co.**, Seneca Falls, N. Y. Former executive vice president, he succeeds **Edwin R. Smith** Sr., retired. **Daniel V. McNamee Jr.** was elected chairman.

George Rienerth was appointed products manager, Electronic Controls Div., **National Acme Co.**, Cleveland.

Robert T. Curcuru was appointed a vice president of **Pioneer Engineering & Mfg. Co. Inc.**, Detroit, and general manager of its new Wettlaufer Mechanical Engineering Div. He headed his own research and design engineering firm.

Ross O. Lamb was made field sales manager; **Robert K. Spangenberg** assistant chief engineer of **Cincinnati Cleaning & Finishing Machinery Co.**, Cincinnati.

Nathan H. Koslow was elected president of **Penn Scientific Products Co.**, Abington, Pa. He continues as president of Associated Sales Co., Richmond, Va., but will make his headquarters in Abington.

C. A. Lovgren was made assistant

HERBERT A. PAKRUL
Atlas Titanium v. p.

MILES R. GLASER
Ferro Union v. p.

EDWIN R. SMITH Jr.
Seneca Falls Machine pres.

NATHAN H. KOSLOW
Penn Scientific pres.

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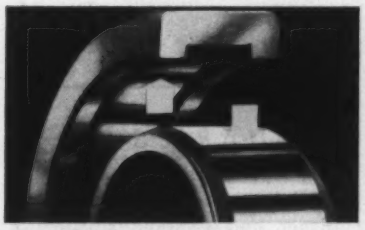

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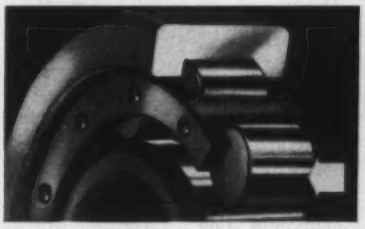

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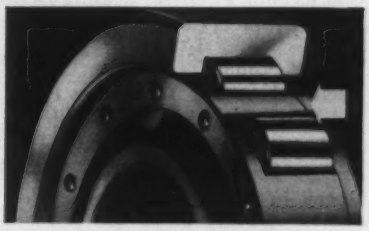

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PETER REBECHINI
Thor Power-Aurora Wks. mgr.

C. R. BRADLEE
Bliss-Press Div. sales

W. H. SHOTTON
American Motors Ltd. wks. mgr.

JOSEPH P. KLEIN
Caloric Appliance plant mgr.

to the president, **Swindell-Dressler Corp.**, Pittsburgh.

C. R. Bradlee was made manager of cold forming sales for the Press Div. of **E. W. Bliss Co.**, New York. He was senior project engineer of cold forming for Hyatt Bearing Div., General Motors Corp.

Warren Pumps Inc., Warren, Mass., elected three vice presidents: **Howard L. Glass** in charge of federal-marine sales; **Walter B. Eklund** in charge of operations; **Charles F. Dexter** in charge of industrial sales.

General Metal Products Co., St. Louis, elected **Ralph Mattick** to the office of vice president with the title of executive vice president. He was vice president-sales. **Charles H. Wensler** was made plant manager.

David D. Black was named to the new post of assistant sales manager for distributor relations of **Cincinnati Milling Products Div.**, Cincinnati Milling Machine Co., Cincinnati.

W. H. Shotton was appointed works manager of **American Motors (Canada) Ltd.'s** Rambler plant in Brampton, Ont., subsidiary of American Motors Corp.

Caloric Appliance Corp., Jenkintown, Pa., promoted **Joseph P. Klein** to manager of its Topton, Pa., plant. He was production manager there and is succeeded by **Joseph M. Langseth. Einar Andersen** was made superintendent of the plant's Press and Tool & Die Depts.

Oldsmobile Div., Lansing, Mich., General Motors Corp., named **Robert W. Truxell** director of its newly established Design Reliability Program. His title is director of reliability.

W. F. Jenkins was made sales manager for the Hamilton, Ohio, Div. of **Bendix Aviation Corp.**

James P. Bacon was made Chicago district sales manager, **National Tube Div.**, U. S. Steel Corp.

Wallace Denhoff was made manager, Pump Div., **Binks Mfg. Co.**, Chicago. Primarily in sales, he will also be in charge of engineering and administration of the department.

J. F. Donohue was named general manager, Products Div., **Kaiser Aluminum & Chemical Corp.**, Oakland, Calif. He succeeds **Howard C. Holmes**, recently made a vice president of the corporation. Mr. Donohue was special assistant to the president.

Peter Rebechini was named chief engineer, Aurora, Ill., Works, **Thor Power Tool Co.** He was chief electric tool engineer.

Kaiser Aluminum & Chemical Corp., Oakland, Calif., appointed four vice presidents. They are **Ray G. Boyd**, former general manager, International Div., and vice president of Kaiser Aluminum International Inc., now vice president-sales; **Howard C. Holmes**, former general manager, Products Div., now vice president-marketing; **Fred J. Drewes**, former administrative manager, now vice president-advertising and public affairs; and **Jack W. Watson**, named vice president of the subsidiary, Kaiser Aluminum & Chemical Sales Inc.

Kenneth J. Brundage was made sales manager and assistant general manager, Foil Container Div., **Revere Copper & Brass Inc.** In addition, he continues as sales manager for Revere's Clinton, Ill., Mfg. Div. He remains in Chicago.

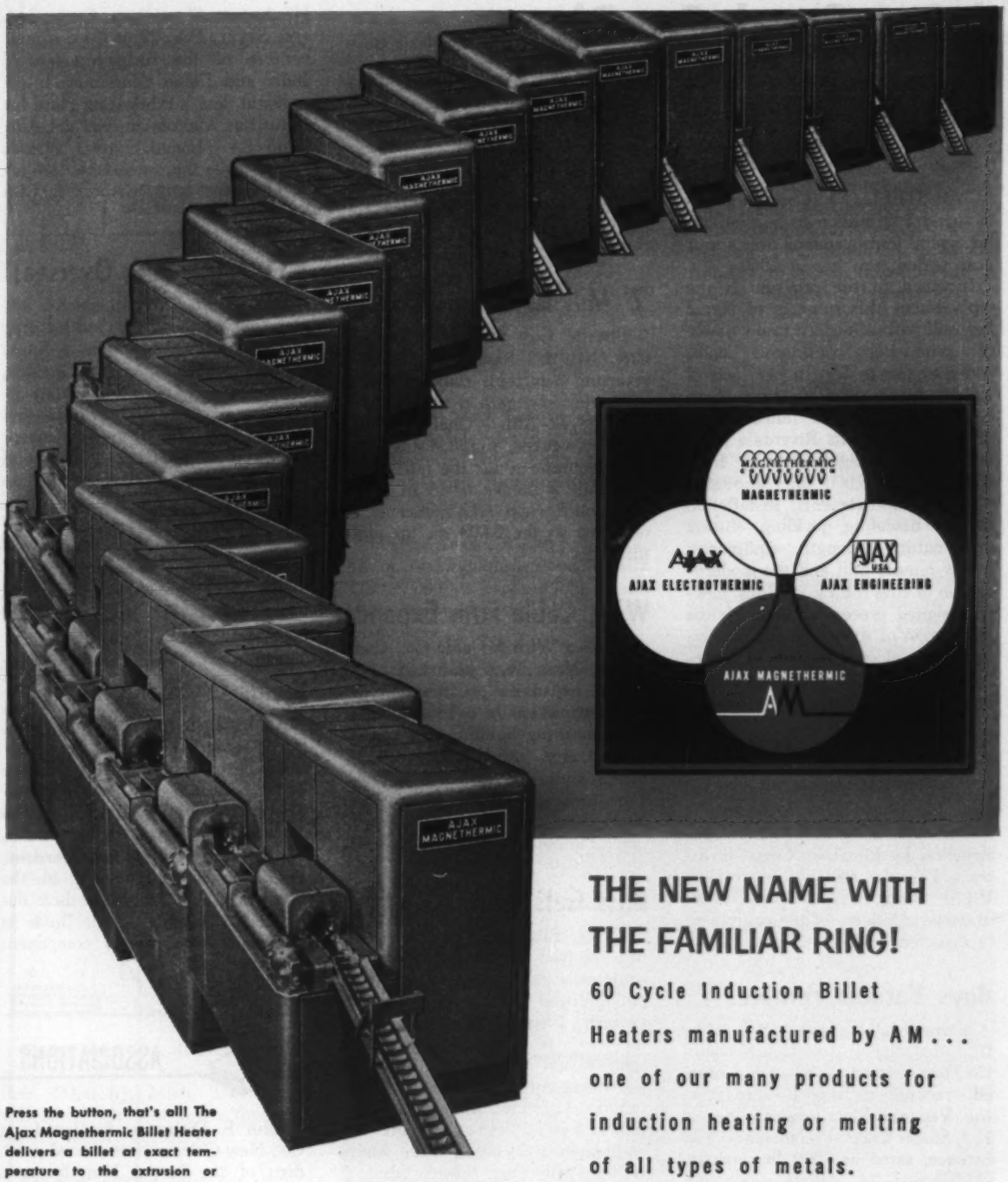
OBITUARIES...

J. R. Paisley, vice president-general manager, and assistant treasurer of **Wean Equipment Corp.**, Cleveland, died Mar. 2.

Edward J. Dalton, 82, chairman, **Yates American Machine Co.**, Beloit, Wis., died Mar. 28.

George I. Danly, 63, senior vice president, **Danly Machine Specialties Inc.**, Cicero, Ill., died Mar. 28.

Mortimer H. Hawkins, 50, chief engineer, **Erie Enameling Co.**, Erie, Pa., died Mar. 26.



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Acme Steel Co. Plans Major Capital Spending

ACME STEEL CO., Chicago, plans to spend $40 million to $45 million for capital improvements over a four year period, starting in 1960.

Included in the program is the replacement this summer of No. 2 hot mill with a modern mill capable of producing continuous coils, weighing up to 550 lb per inch of width. After those facilities have been integrated and tested, Acme plans to expand its Riverdale plant and increase ingot capacity from 452,000 to 675,000 tons annually.

Other improvements: Installation of new descaling, pickling, slitting and cutting-to-length equipment; a new temper mill and the modernization of cold rolling facilities; newly designed processing lines for the production of strapping; the conversion of an electric furnace at Acme-Newport Steel Co., Kentucky subsidiary, from side charge to top charge.

Republic Orders Mill

Republic Steel Corp.'s South Chicago, Ill., Works has ordered a three stand, tube sizing mill. Under construction by Birdsboro Corp., Birdsboro, Pa., the mill will warm roll P-110 tubing 4½ to 10¾ in. in diameter. Delivery of the equipment is expected early in 1960.

Buys Vacuum Furnace

Sierra Metals Corp., Wheeling, Ill., subsidiary of American-Marietta Co., has ordered an induction heated, vacuum melting furnace from the Vacuum Metallurgical Div. of F. J. Stokes Corp., Philadelphia. The furnace, rated at 4000 lb capacity, is designed for volume production of nickel and cobalt alloys.

Firm Changes Name

Standard Railway Equipment Mfg. Co., Chicago, will be renamed Stanray Corp., effective in May. The new name will reflect the firm's expanding interests. Company products include: Railway equipment, outboard boats, airport terminal buildings, structural steel, precision machinery parts, and truck body components.

'Z' Mill Rolls Tin Plate

Granite City Steel Co., Granite City, Ill., will soon install a nonreversing Sendzimir mill to roll 40 in. wide, low carbon steel to tin plate gages. Allis - Chalmers Mfg. Co., Milwaukee, supplied the electrical equipment for the mill drive. The mill will take 0.015 in. thick cold rolled strip and reduce it in one pass to the 0.008 in. tin plate thickness.

Wire, Cable Firm Expands

Simplex Wire & Cable Co., Cambridge, Mass., has launched a $3 million expansion program, including construction of a 100,000 sq ft manufacturing building at its plant in that city. Additional manufacturing equipment will be purchased. The firm also operates a plant in Newington, N. H., for the production of submarine cable.

Bliss Gets Belgian Order

E. W. Bliss Co., Canton, Ohio, has received an order for rolling equipment valued at more than $2 million from St. Ame d'Esperance-Longdoz, Liege, Belgium. The order includes a 66 in., four high, temper mill; a hot strip downcoiler and conveying equipment; and the conversion of a 56 in., three stand, Bliss mill to a 66 in., four stand mill. The equipment will be built at Bliss's Rolling Mill Div., Salem, Ohio. A complete automatic system for the handling, banding, weighing, and recording of coil production will be included.

Kaiser Builds Abroad

Kaiser Aluminum & Chemical Corp., Oakland, Calif., has started construction of two projects overseas: A reduction plant in India for Hindustan Aluminium Corp. Ltd. (see STEEL, Feb. 22, p. 34), a joint venture of the Birla interests of India and Kaiser Aluminum International; and a fabricating plant for Industrias Manufactureras del Alumino SA (Imdasa), near Buenos Aires, Argentina, owned by Guillermo Decker SA in partnership with Kaiser.

A.O. Smith Adds Overseas

A. O. Smith International SA, foreign subsidiary of A. O. Smith Corp., Milwaukee, has established a European subsidiary, AOS AG, Zug, Switzerland. AOS will negotiate licensing agreements in Europe and the Middle East. One agreement has been arranged with Ruhrstahl AG, Hattingen, West Germany, to make and sell capital goods equipment for the oil and petrochemical industries. In South America, an agreement with Casya, Buenos Aires, covers the manufacture and sale of Smith-Erie petroleum product dispensing pumps.

Builds Cryogenic Plant

Air Products Inc., Allentown, Pa., is installing an ultralow temperature plant to commercially produce liquid helium (−452° F) and liquid hydrogen (−423° F) at its Metropolitan District facility, Iselin, N. J. Research centers, universities, and industrial laboratories in the Northeast have increased their demand for these cryogenic fluids in electronics and missile component testing.

ASSOCIATIONS

John F. Disimone, Rudiger-Lang Co., New Orleans, was elected president of the **Screen Manufacturers Association**, Chicago. Elected vice president was Cliff W. Pratt, Universal Molding Co., Lynwood, Calif. George M. Schlosser, Chicago, was re-elected secretary and treasurer.

Wendell C. Davis, Cribben & Sexton Co., Chicago, was elected president of the **Gas Appliance Manufacturers Association.** He served during the last year as first

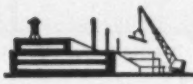
vice president and succeeds Edward A. Norman, Norman Products Co., Columbus, Ohio.

CONSOLIDATIONS

Modern Mfg. Co., Willow Grove, Pa., purchased **Super Slugger Co.**, Bedford, Ohio. Machinery and equipment are being transferred to Willow Grove. Production of the Super Slugger electric hammer will continue as part of Modern's line of nibblers, drill saws, air powered hammers, and portable punch presses.

Union Tank Car Co., Chicago, acquired part interest in **Mechans Ltd.**, Glasgow, Scotland. Union will share ownership with **Horseley Bridge & Thomas Piggott Ltd.**, Tipton, England. The firm fabricates storage tanks, spheres, pressure vessels, and other metal and plastic products.

Safway Steel Products Inc., Milwaukee, purchased **Beatty Scaffold Inc.**, San Francisco, and its subsidiaries. The Beatty firms will be operated as the Safway-Pacific Div. James C. Jay, vice president for sales of Safway, has been named president of the new division.



NEW PLANTS

Eaton Mfg. Co., Cleveland, will build a research center in Southfield (Detroit), Mich. The center will be 50 per cent larger than the present facility in Detroit.

Black & Decker Mfg. Co., Baltimore, manufacturer of portable electric tools, will build a plant at Solon, Ohio, for its subsidiary, Master Power Corp. The 50,400 sq ft plant will cost about $700,000.

Allis-Chalmers Mfg. Co.'s Tractor Group, Milwaukee, is constructing a 20,000 sq ft building in Harvey, Ill., to house its Retail Material Handling Branch and the Wholesale Engine-Material Handling Branch, both of Chicago. Two blocks from the main office and plant, the facility will combine office, warehouse, part storage, and display area.

Powercon Corp., Arbutus, Md., has established a 9000 sq ft plant for the design and manufacture of electrical controls and switch gear for industry.

McCormick Steel Co., Houston, is building a $150,000 addition to its plant. The 24,000 sq ft structure will house stocks of stainless steel and aluminum.

Crucible Steel Co. of America, Pittsburgh, has opened a 6000 sq ft warehouse in Tulsa, Okla., to stock specialty steels. Robert Akeman is district manager.

San Jose Steel Co., San Jose, Calif., has opened a plant in Phoenix, Ariz. The 20,000 sq ft plant will handle fabrication and installation of reinforced steel.

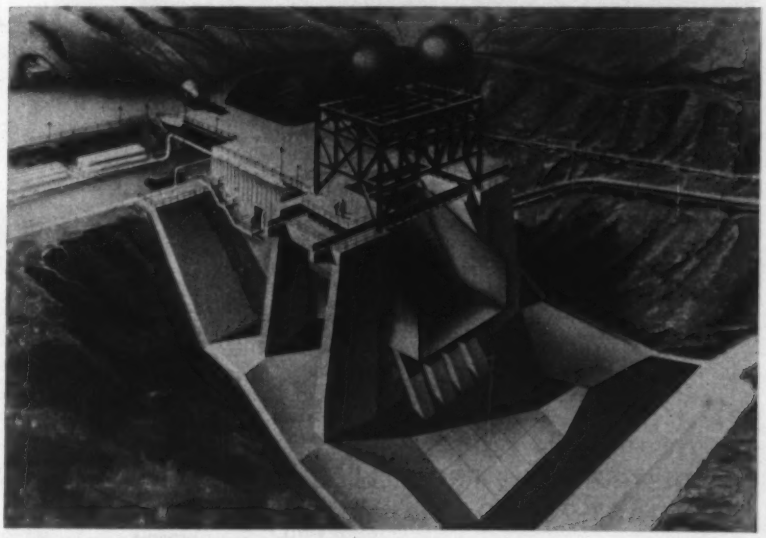
Anchor Alloys Inc. established a plant at 354 Manhattan Ave., Brooklyn, N. Y. The office and sales department will remain at 968 Meeker Ave., Brooklyn. The company specializes in the precious alloys required in the manufacture of electronic semiconductors.

A. M. Castle & Co., Chicago, is constructing a warehouse in Bedford Heights, Ohio, near Cleveland. The 125,000 sq ft service center will carry stocks of carbon steels, alloys, stainless, and aluminum products. Another 18,000 sq ft warehouse in Galion, Ohio, will begin operation in May.

NEW ADDRESSES

Parker-Hannifin Corp., Cleveland, moved its field sales office to larger quarters at 19 Railroad Ave., Emerson, N. J. H. A. Ludlam is district manager.

Airborne Instrument Laboratory, a division of Cutler-Hammer Inc., Milwaukee, moved all general administration, engineering, and production facilities to Deer Park, N. Y., and all research and development facilities to Melville, N. Y.



TEST STAND 1-B AT EDWARDS AIR FORCE BASE in California will be completed this fall—ready to accommodate a cluster of four liquid rocket engines, each having a thrust of 1.5 million lb. It was designed by Aetron Div., Aerojet-General Corp., for the U. S. Army Corps of Engineers (which handles Air Force construction contracts). The concrete structure is 125 ft high. The steel superstructure supports the propellent tanks and the engines. It is bolted to heavy steel bearing plates anchored into the concrete by pretensioned steel cables. The test complex includes two water systems, storage and transfer systems for liquid oxygen, fuel, and high pressure nitrogen gas, recording and control instrumentation, and service shops. Cost: $4.7 million

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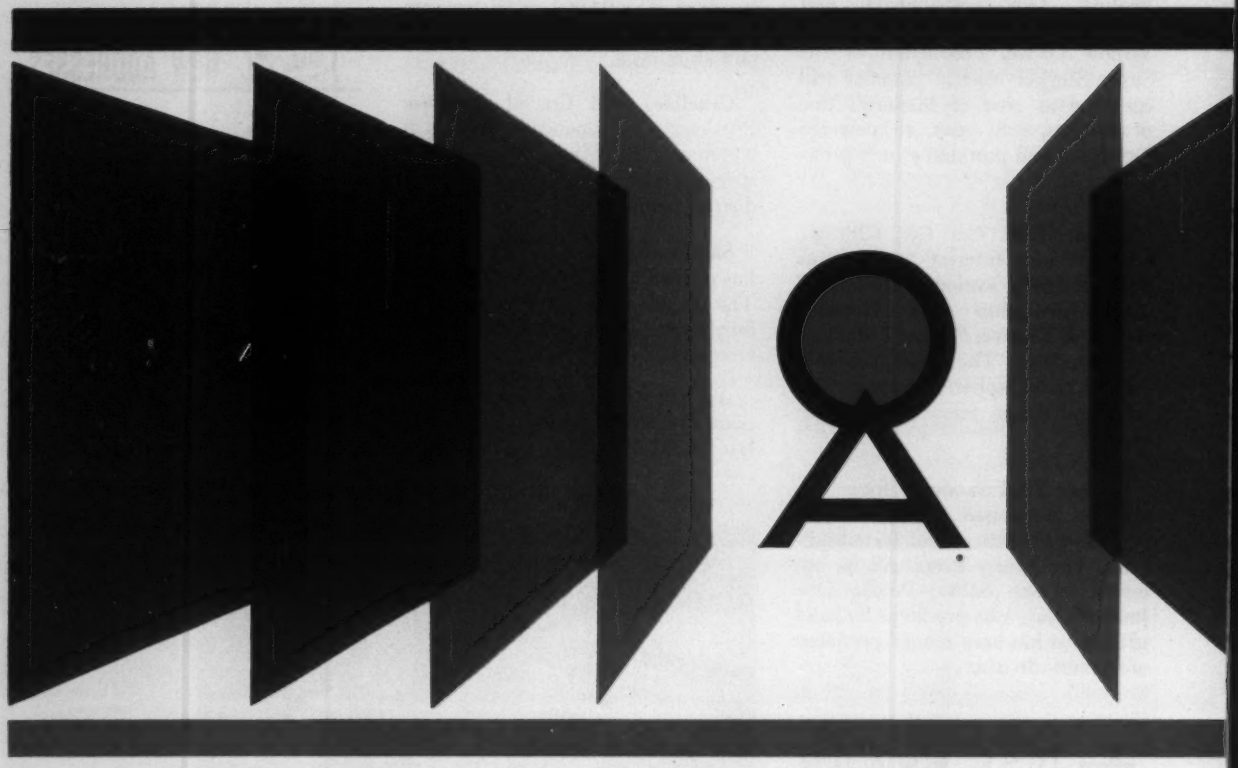

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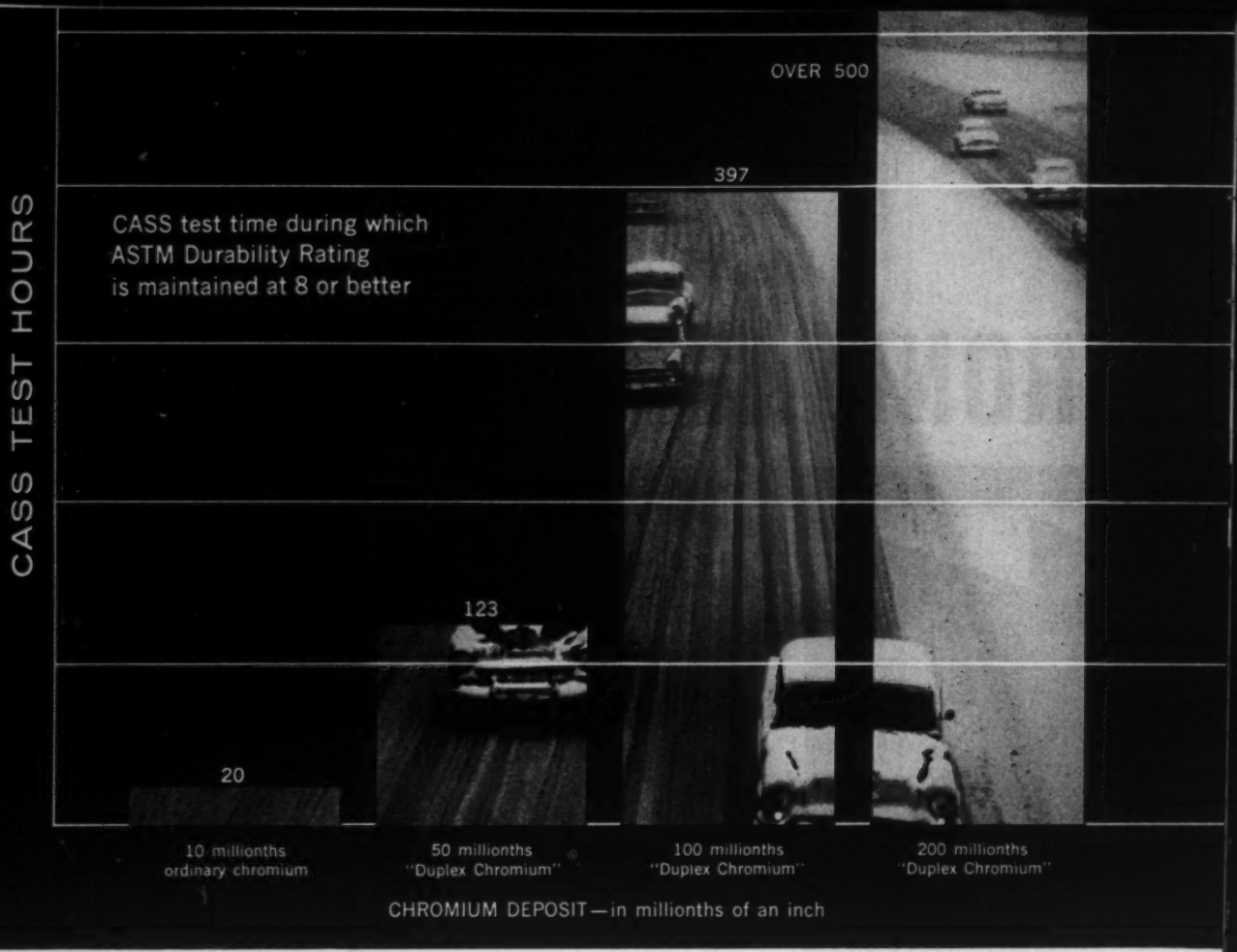

The thicker the "Duplex Chromium" ...the longer the plating lasts

You'll now do more to increase durability of plated parts with a little more chromium thickness properly applied than with any other change in plating specifications. Results with M&T "DUPLEX CHROMIUM" confirm this beyond all doubt. There's dramatic improvement with 50 millionths of an inch. With 100 millionths it's downright phenomenal . . . and with 200 millionths, you have the finish of the future.

The graph shows this clearly. These are results with zinc die castings plated with identical undercoats but with different chromium topcoats. See the difference M&T "DUPLEX CHROMIUM" makes in durability. Note that the thicker the chromium, the longer the service life expectancy. Corrodkote accelerated corrosion tests show the same pattern of protection and durability.

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HOW BEARINGS FAIL— Lubrication problems are at the bottom of most failures of high performance bearings, experts say. Why and how are targets of researchers. One theory: "Invisible" particles abrade metal oxide film, releasing electrons from exposed pure metal. They then act like a catalyst to polymerize the lubricant, interfering with proper action, states Alloyd Corp., Cambridge, Mass.

ELECTRON BEAM COSTS— Latest melting and refining costs for extreme purity metals runs about 46 cents a pound, reveals Dr. Hugh Smith, president, Temescal Metallurgical Corp., Richmond, Calif. His firm is building a vacuum setup which will melt 20 in. ingots and require 1.5 million watts of power.

ELECTRIFIED EARTH—The builder of the Trans-Canada highway had to sink piers for a bridge into a long slope of wet, unstable soil. He buried anodes and cathodes in the earth, applied 150 volts at low amperage. Water was drawn out by electro-osmosis and removed by well-points and pumps. The soil stood the pile driving.

SPEEDY WELDING—Chevrolet truck frames are being welded with the CO_2 process at 200 ipm, states the Auto Div., A. O. Smith Corp., Milwaukee. Automatic machinery is turning out about 85 frames an hour.

URANIUM FOR SALE— You can get safe-to-use (depleted) uranium for about $4.60 a pound in 1400 lb lots from the Atomic Energy Commission, Oak Ridge National Laboratory, Oak Ridge, Tenn. A number of firms are already trying the material in missile and aircraft structures. Uranium strength-weight ratio is five times better than steel although it's said to be three times more brittle.

QUICK CHECK— New electronic devices greatly speed checkout inspections of systems used in missiles, declares Radio Corp. of America, New York. One completely checked out a subsystem for a missile in 5 minutes—a procedure which used to take more than 4 hours when done manually. The checking device also spells out the trouble and remedy on an automatic typewriter thus: "Resistor R-137 shorted. Replace with ORD Part 123456."

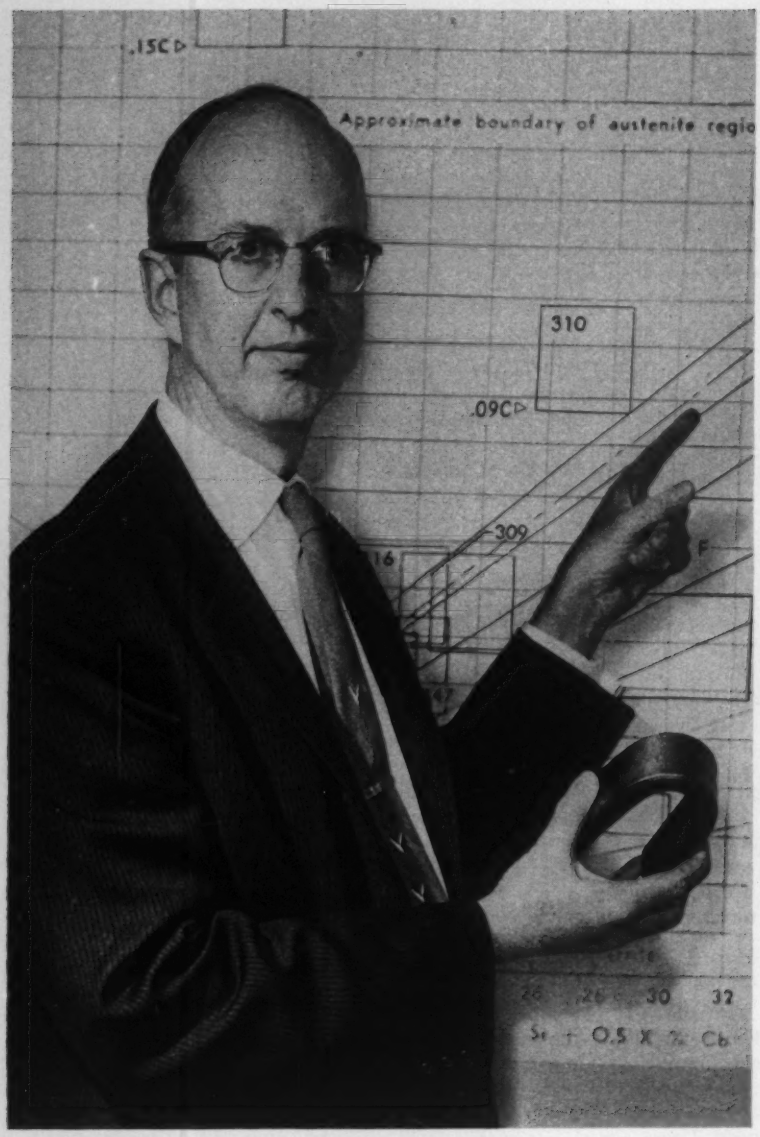
CUT HOT CRACKS IN STEEL— A combination of high sulfur and phosphorus, even when within commercial specifications, greatly reduces the hot tensile strength and ductility of high strength steels used in missiles, says R. E. Monroe, Battelle Memorial Institute, Columbus, Ohio. He proposes a limit on each element of less than 0.010 per cent to overcome the cracking encountered in welding such steels.

MAGNETIC SOLUTION NEAR— Solution of a metallurgical mystery—magnetic annealing—is near, say researchers at Bell Telephone Laboratories, Murray Hill, N. J. Recent work shows that magnetic polarization during heat treatment in a magnetic field doesn't occur in Permalloy or Perminvar unless oxygen is present (minimum: 14 parts per million). Conclusion: More uniform magnetic materials may come from closer oxygen control.

CUTS CHIPMAKING— Use of precision, cold formed blanks of 410 type stainless is said to be reducing material costs in building outboard motor propeller shafts at Evinrude Motors Div., Outboard & Marine Motors Co., Milwaukee. One of the suppliers, Molloy Mfg. Co., Detroit, claims many metalworking plants report such savings, particularly if a wide range of shaft diameters is involved.

BETTER TITANIUM BRAZE— Joining of titanium with silver-aluminum alloys produces better high temperature strength and corrosion resistance than silver-lithium types, says Convair Div., General Dynamics Corp., Ft. Worth, Tex. Results were obtained in inert gas retorts in conventional furnaces. Parts are being used in advanced aircraft and missiles.

Welding Equipment Makers to Push



Aims of American Welding Society program: Better methods; more emphasis on welding in college engineering courses; greater awareness of welding's role at managerial level; and promotion of sensible specifications, codes, and inspection requirements

R. DAVID THOMAS JR., the next president of the American Welding Society, will urge his industry to come up with technological developments that will make a hefty contribution to higher production efficiency in metalworking.

His goals: Help metalworking managers lower costs and aid them in competing with foreign manufacturers enjoying an ever increasing wage-cost differential.

You'll be hearing a lot about the 45-year-old president of Arcos Corp., Philadelphia. His across-the-board program will advocate: The development of better welding methods; giving engineers a more extensive education in welding; spreading understanding of the place of welding; and the adoption of sensible specifications, codes, and inspection requirements. Those things, Dave Thomas believes, will benefit the American manufacturer who is fighting to hold a fair share of world and domestic markets.

A Decade of Progress

"American engineers are constantly being pressed to find ways of reducing our costs to meet foreign competition. Welding engineers are no exception, for fabrication so often employs welding. And welding has been a tremendous force in reducing metal fabricating costs," says Dave Thomas, adding:

"Consider this: Ten years ago practically all arcwelding was done by coated electrodes depositing less than 5 lb of metal per arc hour. The usual shop average for arcwelders

Meet R. David Thomas Jr.

Dave Thomas has long been an advocate of quality control and the development of better welding techniques. As president of the American Welding Society, he will spend much of his time during the coming year promoting the process and the industry.

Now president of Arcos Corp., Philadelphia, Dave was graduated from Cornell University. He has taught at Temple and Drexel Institute of Technology. At Drexel, he helped put welding courses into the curriculum.

His hobbies: Sailing, photography, and work.

Fight on Costs

was 20 to 35 per cent arc time. Today the use of submerged arc and other automatic processes has increased enormously, giving deposition rates of 10 to 30 lb per arc hour, and operators may average 50 to 70 per cent arc time."

Where fabrications do not lend themselves to fully automatic welding processes, new semiautomatic processes still permit large increases in efficiency. Gun-type welding tools eliminate downtime formerly required to replace a stick electrode. New iron powder electrodes depositing up to 15 lb of metal an hour have doubled and trebled the operator's efficiency.

Positioning fixtures greatly speed welding rates. Where positioning cannot be used, the new semiautomatic processes increase the efficiency in out-of-position welding.

For heavy fabrications, the electroslag welding process, giving 30 to 120 lb per hour and 100 per cent operating time (STEEL, Jan. 18, p. 101), offers opportunities for cutting fabricating costs. Imported from Europe, the process has recently been introduced in this country.

Need Better Awareness

Dave Thomas believes a lack of welding education prevents the metalworking industry from making full use of all available techniques and processes. Many colleges and universities offer engineers little or no experience with welding as a means of joining metals.

He thinks we are short of engineers who have been trained specifically for the development, promotion, and application of cost-cutting welding methods, and we are also hampered because many managers have insufficient experience or training in the fundamentals of welding to make the most intelligent use of it.

Overcaution Ups Costs

Lack of knowledge is often the cause of welding specifications that are too costly, says Mr. Thomas.

"I personally have been associated with many projects requiring the ultimate in quality and integrity. In such applications, no effort was spared to establish strict performance standards and to see that they were met. That has been healthy, for when welding proves itself under severe conditions of service, there should be little to fear when it is employed as a general construction tool.

"Unfortunately, the more common structural designs are frequently supervised by those not thoroughly trained in welding or who fail to call in welding specialists. The result sometimes is the establishment of either an excessive amount of welding or an excessive amount of inspection. Either or both are cost additions—and often unnecessary.

"I would be the last to argue against codes, specifications, and inspection efforts, if the result is to lower the integrity of the structure being fabricated. But I will join my voice to the multitude of others who decry overwelding and the costly inspection routines which plague some sections of our metal fabricating industry. It may be that foreign competition, forcing us to reduce our costs, will, in fact, be the agent that will force us to re-examine some of those costly inspection procedures."

Proposals for Growth

If welding is to play a more important part in the economic conflict which faces the U. S. metalworking industry, Dave Thomas suggests:

- A broader understanding and a more extensive educational program for our engineers will facilitate the cost-saving advantages obtainable through welding.
- Americans should be more diligent in searching out foreign know-how and adapting it to improve our fabricating methods.
- Where rigid inspection standards are no longer necessary, they should be ruthlessly weeded out, and thus further reduce costs.

WELDING SHOW SECTION

	Page
Welding Equipment Makers to Push Fight on Costs	88
Electron Beam a Hit	89
Welders See Uptrends in CO_2 Semiautomatic Processes This Year	90
Program, AWS 41st Annual Meeting	92
Russians Weld Rivets with Coated Electrodes	100

Electron Beam a Hit

Makes steady progress in welding, melting, and machining. Developments are reviewed

A NEOPHYTE production tool, the electron beam, is slowly but surely welding, machining, and melting its way into a position of importance.

Two hundred participants at a recent Boston symposium reviewed these accomplishments:

- Successful, tight, high quality welding is being done on atomic reactor and missile parts.
- A 1.5 million watt drip melting furnace is under construction. It will handle 20 in. billets of exotic or refractory metals.
- Present techniques permit drilling 0.00075 in. holes in practically any material that won't vaporize.
- New developments by Carl Zeiss, Germany, permit electron beam machining operations to be programed on magnetic tapes.

Low power consumption with high energy concentration was one of the important points stressed at the symposium.

Current machining efforts center heavily around diework, especially those used in the synthetic textile industries. Experimental work indicates that diamond wire-drawing dies can be drilled by this method.

Tape programing will permit more automatic repetitive operations and will greatly speed the making of workpieces like diffraction gratings or color television tube screens.

Welders See Uptrends In CO_2 Semiautomatic Processes This Year

Operator finds it's easy to join light gage metal with Dip-transfer process which features small wire, low voltage settings. Parts are for an automobile air filter

New power sources, improved electrodes, electron beam method are other areas they feel are important. Here's a rundown on what visitors will see at the welding show, Apr. 25-29, at Los Angeles

"WE expect to see twice as many semiautomatic (CO_2, small wire) units in use in the next three years." (W. H. Hobart Jr., Hobart Bros. Co., Troy, Ohio.)

"THE CO_2 process with cored wire will show the biggest gain in the industry during 1960." (Perry Arnold, Chicago Bridge & Iron Co., Chicago.)

"WELDERS will be paying increasing attention to finding defects in the whole plate, not just the weld alone." (Franklin B. Catlin Jr., sales promotion manager, Magnaflux Corp., a subsidiary of General Mills Inc., Chicago.)

"ALTERNATING current welding —a big gainer in recent years—will continue to increase. But contrary to other opinions, we believe it will level off this year." (Charles Herbruck, director of publicity, Lincoln Electric Co., Cleveland.)

Those comments foreshadow some of the major trends that will be in evidence at the 41st annual welding conference, Apr. 25-29, at Los Angeles. Such trends mean added production dollars to industry through increased efficiency—faster speeds, deeper penetration, stronger, more reliable deposits.

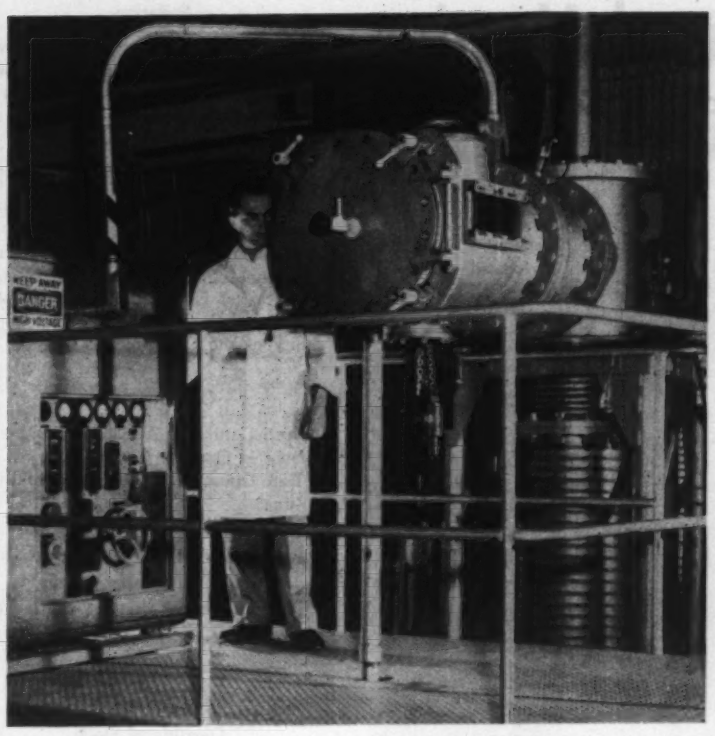
Here are some additional conclusions STEEL editors heard from the experts. They will help you evaluate welding progress and its increasing impact on metalworking.

• Much of the progress in manual welding continues to revolve on semiautomatic devices. Several firms will unveil higher quality covered electrodes or improved power sources.

Mr. Hobart's prediction (twice as many CO_2, small wire units in three years) points up the acceptance of semiautomatic advances in recent years. Those involving cored wires or flux-gas (vapor shield) combinations are expected to enjoy important sales increases.

Lincoln Electric feels that CO_2 has seen its big growth but that the flux vapor shield is on the verge of becoming popular. On the other hand, Westinghouse Electric Co., Pittsburgh, still feels that CO_2 will continue to show gains.

In addition, the new Short-arc or



Electron beam welding will come in for an outsized share of attention. Here is Air Reduction Sales Co.'s entry

Dip-transfer type machines are moving ahead rapidly, especially in the light gage field. One expert points out that the hand units incorporating a 1 lb spool of wire in the gun itself are showing a significant gain, especially in light metal furniture, aircraft, electronics, and small job shops.

In flux-gas combinations, one producer reports it has experienced occasional difficulty in matching flux and job but adds: "We foresee real growth in this area in the next few years, possibly reaching 10 or 15 per cent of the market in terms of pounds of wire used annually."

Firms like Air Reduction Sales Co., a division of Air Reduction Co. Inc., and Linde Co., a division of Union Carbide Corp., New York, stress the increase in precise, special welding devices. Each has invested considerable effort in the design of highly accurate welding equipment and complete packages for its customers.

Some distributors may be in for a larger share of that market, thinks Charles N. Aronson, president, Aronson Machine Co. Inc., Arcade, N. Y. He says: "Buyers have leaned considerably toward 'package' deals where one source supplies equipment, tooling, and positioners. Of late, I believe that trend is reversing itself — more equipment distributors are employing good welding engineers who have great latitude in selecting equipment."

Others don't agree entirely with Mr. Aronson. Says National Electric Welding Machines Co.: "Increasing desire to place responsibility with one firm has spurred much activity at welding manufacturers equipped to build special arcwelding machines. The automatic arc machines and fixtures which combine several operations continue to be a major source of business for us."

• Exotic methods like plasma-arc and electron beam welding, while extremely useful in specialized jobs, are still too new to make much of an impact marketwise, most experts report.

Showgoers may expect to see some electron beam welders and the newer plasma jets in action. Those interested in the electron beam will be told that the same unit can machine and weld. A sidelight on electron beam welds: They are stronger, purer, and sometimes more ductile than the base metal.

• Welding machine makers, looking for their "best year yet," are optimistic about diverse markets; forecasters say sales will climb 7 to 20 per cent over 1959's.

They tell STEEL that their best customers this year will include automakers, railroad car builders, pipeline and large tank fabricators, electrical machinery makers, and erectors of buildings and bridges.

Lincoln Electric expects a significant growth this year in heavy duty applications, such as welded transformer cases, structural joints, and machine tools. Kaiser Aluminum & Chemical Corp., Oakland, Calif., and Aluminum Co. of America, Pittsburgh, predict that weldable aluminum alloys will find still greater usage in welded structures, low temperature vessels, marine and transportation applications, including railroad cars, trucks, and trailers.

• More industry research dollars are being devoted to basic studies of the process.

With the bulk of industry volume still going into single operator, variable power, manual equipment, many producers devote their research to basic investigation of the electrode, welding, and arc phenomena, as well as to studies of base and weld metals. Semiautomatic applications, however, are stimulated as well. Lincoln's vapor shield process, for example, evolved from basic research in arc technology. Air Reduction will also show an advanced model of its Dip-transfer unit.

All in all, say industry sources, the high degrees of control and economy built into the automatic and semiautomatic processes will make them the top sales gainers in 1960.

• If you'd like to have a copy of this article, write to Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. You may win $1000 by using material like this in STEEL. For details, see the Servicenter, Pages 5 and 6.

AWS 41st Annual Meeting

and ASME Metals Engineering Division Conference

Apr. 25-29 — Hotel Biltmore, Los Angeles

Program:

MONDAY

Heat Effects on Steel Weldments

Studies of Hot Cracking in High Strength Weld Metals; Hot Cracking Test for CO_2 Shielded Metal-Arc Welds; Effect of Elevated Temperature Exposure on Heavy Section, Pressure Vessel Steels

Resistance Welding

Resistance Seamwelding of Terne Plate; Resistance Welding Electronic Component Leads to Nickel Clad Copper Wire; Successful Welding of Foil Gages

Structures

Record Size, All Welded Girders Feature New Nisqually Glacier Bridge; Welding of the *Triton*—World's Largest Atomic Submarine; Largest Welded "T-1" Steel Spiral Casings

TUESDAY

Fracture Mechanics

Crack Propagation in Thin Metal Sheet Under Repeated Loading; Minimum Toughness Requirements for High Strength Steel for Rocket Motor Cases; Energy vs. Stress Theories for Combined Stress—a Fatigue Experiment Using a Rotating Disc; Microplastic Strain Hysteresis Energy as a Criterion for Fatigue Fracture

Aluminum Alloys

Comparative Properties of Aluminum Alloy Weldments; How to Interpret Fractures in Aluminum Weld Metal; Weldability of Aluminum Casting Alloys with 5086 Wrought Aluminum Alloy

Arcwelding Applications

Internal Welding of Tubes to Tube Sheets; Welding of Nickel-Chromium-Iron Alloy for Nuclear Powerplants; Gas Metal-Arcwelding of Low Carbon Steels

Fracture Mechanics

Fracture of Flat and Curved Aluminum Sheets with Stiffeners Parallel to Crack; A Study of Theories of Fracture Under Combined Stresses; Brittle Fracture Characteristics of Reactor Pressure-Vessel Steel; Use of Center Notch Tensile Test to Evaluate Rocket Chamber Materials

Aircraft

Development of Forming and Joining Techniques for Corrugated Sandwich Structure; Application of 2219 Aluminum Alloy to Aircraft Pressure Vessel Fabrication; Inert Gas Spotwelding in the Aircraft Industry

Fabrication Procedures

Selecting the Correct Procedure for Welding a Given Joint; Method for Determining Expected Amount of Overwelding; Evaluation of Misaligned Buttwelded A286 Sheet Material

WEDNESDAY

Informal Panel Discussion Maintenance Welding

Atomic Reactors, Refineries, Steel, Ships, Railroads

Welding and Fabrication of Ni-Cr-Fe Alloys

Nickel-Chromium-Iron Alloy Forgings for Nuclear Reactor Systems—A Summary of Forging Techniques and Mechanical Properties; Arcwelding of a Ni-Cr-Fe Alloy for Nuclear Powerplants; Fabrication of a 1 in. Thick, 10 in. Diameter, Welded Ni-Cr-Fe Pipe

Rocketry

Welding of Large Rocket Motors; Machine Welding of a Prepackaged Liquid Rocket Engine; Welding of High Strength Steels for Rocket Applications

Weldments

Designing for Production Welding Gives Industry a Fully Accessible Motor; Carbon Dioxide Welding of Heavy Sections for Radio Towers; All Position Welding of HY-80 Steel with the Gas Shielded Process

Nonmetallic Structural Materials

Glass—Ceramics—Principles, Practice, and Properties; Recent Advances in Dispersion Strengthened Metal—Metal Oxide Structures; The Effect of Residual Stress on the Fatigue Strength of Ceramic Coating-Metal Composites

Weldability of Steels

Welding of Low Carbon Martensite; Welding of Ultra High Strength Steel for Missile Motor Cases; The Welding of Heat Treated, Hot Work Tool Steels

Surfacing

Restoring Kraft Digesters by Welded Overlays; New Techniques for Cladding with the Gas Shielded Process; Properties of Plasma Sprayed Materials

THURSDAY

High Alloys

Time-Temperature Parameters Affecting Corrosion of 18Cr-8Ni Weld Metals; Properties of Chromium-Steel Weld Metals; Some Factors Affecting the Weldability of the Cupro-nickels

Oxygen Cutting

Oxygen Cutting of Bevels; Recent Development in Oxy-fuel Gas Cutting; An Up to Date Discussion of Oxygen Natural Gas Cutting

Gas Shielded Welding

Micro-wire Welding; Electrode for Spatterfree Welding of Mild Steel in Carbon Dioxide; Short Arc, Consumable Electrode Welding Applications and New Developments

Ductility of Steels

Notch Sensitivity in High Strength Sheet Materials; Notch Ductile Weld Metal for Dynamically Loaded "T-1" Steel Structures; Some Observations on the Kinzel and Drop Weight Tests

Brazing

New Alloys for Brazing Heat Resisting Alloys; Properties of Stainless Steel Sandwich Using Low Density Honeycomb Cores; Strength of the Single Lap Joint Bond

FRIDAY

Columbium, Titanium, and Zirconium

Welding Columbium and Columbium Alloys; Low Energy Fusion Welding of Titanium Alloys; Diffusion Bonding of Zircaloy Plate Type Fuel Elements

Pipe Lines

Design, Welding Procedure, and Fabrication of Concentric Molten Sulfur Pipe Line; Welding on High Pressure Gas Transmission Pipe Lines; Induction Pressure Welding of Girth Joints in Steel Pipe

Processes

A New Electron Beam Welding Unit; The Characteristics of Flat Welding Wire; Preheated Welding Wires and Their Effect on Welding Characteristics

Hydrostatic Presses Form Shapes, Reform Properties

By JOHN L. LEBACH
Project Engineer
Loewy-Hydropress Div.
Baldwin-Lima-Hamilton Corp.

THREE special techniques are being used to compact and shape complex workpieces. Uniform, controlled pressure (and sometimes programed temperatures) is applied over the entire, often irregular, surface of a workpiece.

Here are the methods used:

• A mechanical design has a conical pot with an inclined plane linkage inside to obtain three directional pressure from a unidirectional source.

• Good results are being obtained with explosive forming. A charge is detonated inside a fluid medium that carries shock waves to the object being shaped.

• With units such as Loewy's hydrostatic press, the object is formed inside a heavy walled, sealed pressure vessel. Hydrostatic pressure is applied evenly to all surfaces, regardless of the object's shape. Depending upon the material, complete chemical, metallurgical, and physical changes can be made by a combined application of pressure and temperature in a precise, often varying, time cycle.

• **Applications**—Industries working with nuclear materials, high temperature alloys, cermets, ceramics, and powdered metals have started to adopt the hydrostatic press. One Loewy unit was installed for the Atomic Energy Commission.

Hydrostatic presses can compact sponge metals and form high alloy sheets. Powder materials are placed inside a flexible plastic or rubber sack. The forming method complements such techniques as explosive forming.

• **New Loewy Design**—It's a compound cylinder type, with an open end pressure shell, two sets of flexible mushroom seals, hydraulically operated sealing blocks, and horseshoe type wedge locks. An outside frame holds the seal blocks under pressure. The frame is made of steel plates cut out to receive the pressure shell. It is held together with preshrunk tierods. A welded

The press is in fully open position with the mushroom seal retracted. The pressure shell is withdrawn for loading and unloading. A runout slide is used

support frame is used. A runout slide handles loading and unloading of the pressure shell.

The pressure shell is assembled from an inner liner, a sleeve, and four outer rings (with reinforced ends) all shrunk together. This design and assembly method permit a controlled, prestressed condition which makes more effective use of the material in the pressure shell and makes a 40 per cent weight saving possible.

• **Chamber Breathes** — The entire unit breathes (expands and contracts) under any number of load and processing cycles without formation of stress concentrations and points of possible fatigue failure.

In one size press, a load can cause a ¼ in. free radial expansion of the pressure shell and a ⅝ in. axial expansion of the independent frame plate. To seal the shell opening, the flexible seal must first enter the shell opening, then maintain sealing action under load while growing ¼ in. radially. Simultaneously, the seal has to slide ⅝ in. upward along the sealing line at the inside periphery of the pressure shell. Requirements are met by a modified obdurate mushroom seal.

A pad of nitrile rubber is mounted in the seal assembly, between a gun steel block and a backup plate. The special anti-extrusion and retaining rings are made of bronze.

In the past, pressure vessels and hydrostatic presses with up to several hundred tons of capacity were made from tubular shells with threaded closures. Larger vesels were built as a compound cylinder with gun breach closures and with rigid joints between the shell and the end closures. Threaded or wedge type connectors were used. But larger vessels using this conventional design failed in fatigue at the threaded closure and made threadless construction mandatory.

• **Testing** — The first hydrostatic press built on the deflect and breathe principle was subjected to exhaustive tests. Eighty strain gages were located at all critical points of the structure. Many of the 1500 readings were used to plot experimental stress-strain curves for critical locations. The most important strain gages were maintained as permanent control elements. They were integrated into the installation's elaborate safety system for future checking.

• **Press Ratings**—Rated capacity is determined by maximum unit pressures and temperatures, size of the sealed opening, and the useful volume into which a charge can be introduced. The seal area is multiplied by maximum unit pressure (under normal operation) to obtain the total seal pressure. That figure can be used to compare ratings of the hydrostatic presses with those of conventional forming machines.

The unit installed for the AEC has a clear inside diameter of 30 in. and an inside length of 10 ft. It uses mineral oil as the operating fluid at a normal operating pressure of 30,000 psi and a maximum temperature of 300° F. It's comparable to a conventional press with a normal rated capacity of about 10,000 tons.

A later Loewy design has an inside diameter of 60 in., with a clear length of 60 in. Total pressure is more than 42,000 tons at 30,000 psi.

Paint Line Processes 66 in. Aluminum Coil

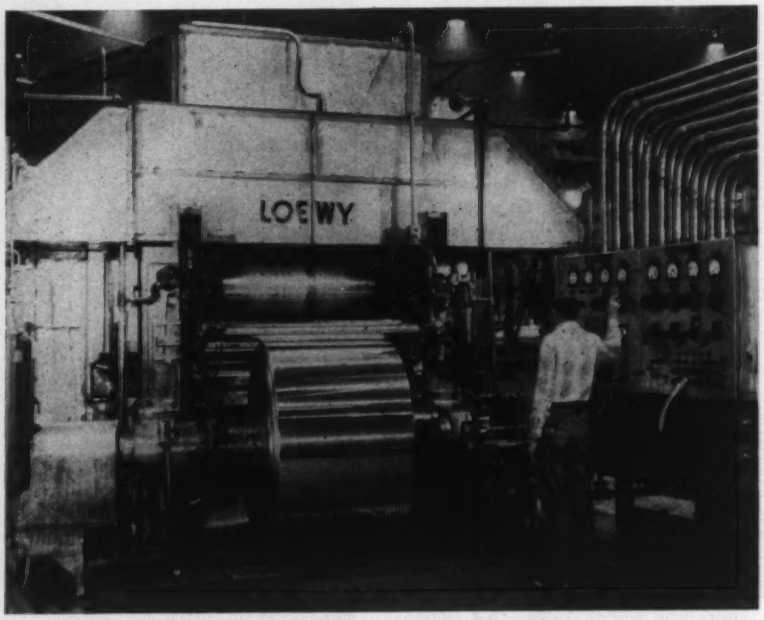
A new, 66 in. line that produces painted aluminum coil is in operation at Kaiser Aluminum & Chemical Corp.'s Ravenswood, W. Va., rolling mill.

The equipment is completely automatic, with the metal passing through 14 steps. After the coil is unwound, the aluminum is cleaned, rinsed, given a chemical precoat, and rinsed again.

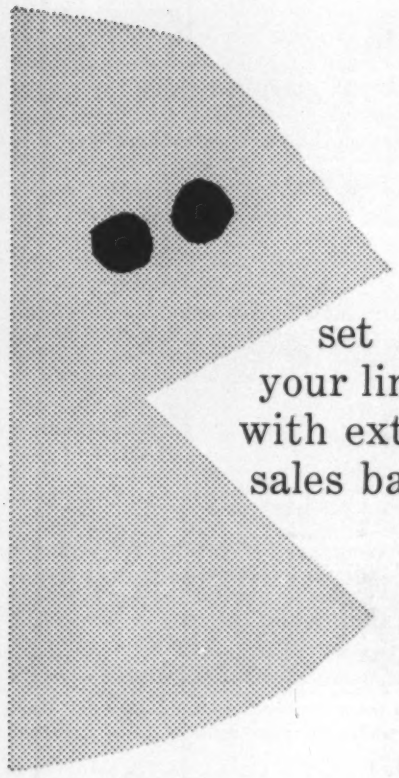
The metal is dried and passed through the roll center for painting (one or both sides), then conveyed through a 100 ft long, three stage drying oven. Following baking and quenching, the aluminum is rewound and packaged.

The end product, called Kaiser Kote, is used by fabricators to make such things as awnings, residential siding, and license plates.

KaiserKote is available in a wide variety of colors and in finished widths from 2 to 66 in. The material can undergo bending, crimping, blanking or flattening without damaging the finish.



FOUR HIGH FOIL MILL at the Ravenswood (W. Va.) plant, Kaiser Aluminum & Chemical Corp., is regulated by an automatic gage control setup supplied by Westinghouse Electric Corp., Pittsburgh. An x-ray gage measures thickness of aluminum foil as it is rolled, feeding a signal to the control system when the foil is offgage. Controls vary roll speed, roll-to-foil friction, and foil tension, holding material within 1½ per cent of nominal 0.00035 in. thickness



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for CORROSION RESISTANCE

Anywhere there's a corrosion problem . . . there's a place for INLAND TI-CO! More and more, makers of famous-name appliances, producers of farm equipment, manufacturers of thousands of products which must withstand moisture-laden atmospheres, in or out-of-doors, are recognizing non-flaking TI-CO as the standard of excellence in galvanized sheets. ■ TI-CO galvanized sheets keep your product components functioning longer and add years to the appearance of the finished product . . . giving consumers greater value and adding "sales bait" to your product line.

INLAND STEEL COMPANY 30 West Monroe Street • Chicago 3, Illinois Sales Offices: *Chicago • Davenport • Detroit Houston • Indianapolis • Kansas City • Milwaukee • New York • St. Louis • St. Paul*

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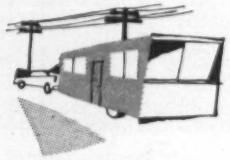
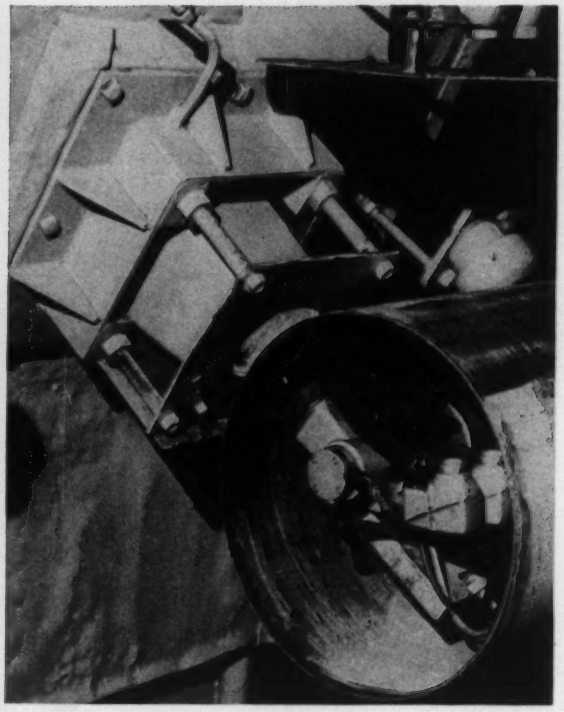


TI-CO protects families, too, in modern house trailers. Thousands of these compact, mobile homes have roofs made of this non-flaking galvanized sheet.

Years of corrosion-resisting service are added to washers, dryers, refrigerators and other appliances whose parts are made of non-flaking TI-CO.

Poultry feeders and other farm equipment subjected to weather and abusive chemicals last longer when made of non-flaking TI-CO.

Fluoroscope image of the welded seam is projected on a screen in the inspection booth as the length of pipe passes



Long boom holds the x-ray head inside the pipe and keeps it "on target" while the pipe weld is being inspected

Continuous Fluoroscoping Spots Pipe Weld Defects

Quality control device checks the entire seam; instantaneous viewing of the x-ray image permits the inspector to take a longer look at doubtful areas

HIDDEN FLAWS in welded seams of steel pipe are detected by a continuous fluoroscoping process at National Works (McKeesport, Pa.), National Tube Div., United States Steel Corp.

The process is used to inspect large diameter electric welded pipe, which is used for oil and gas transmission lines.

• The inspection process, which makes use of x-ray and television equipment, is fast and effective.

The fluoroscope unit includes an x-ray head, which casts a shadow image of the weld on the fluorescent screen of an intensifier. The image is strengthened and picked up by a television camera, then projected (greatly magnified) on a television monitor screen.

Sections of pipe 40 ft long are loaded on a carriage which moves past the inspection booth. The x-ray head, mounted on a 48 ft boom, fits inside the pipe. It is aligned with the weld seam, and remains stationary as the pipe passes.

An operator-inspector positions the pipe and controls its lateral movement from a remote panel in the inspection booth. He can slow the movement of the carriage or bring it to a stop immediately, for prolonged examination of any part of the weld.

If a flaw is detected, the operator presses a button, applying a spray of water soluble white paint to the spot for identification.

• The system is said to be one of the first of its kind for quality control of pipe welds.

The rejection rate hasn't changed radically at National Works since the continuous inspection unit was installed in 1959 because of the high quality standards observed in the welding department, says L. F. Sattele, general superintendent. But continuous fluoroscoping insures more complete quality control.

Previously, pipe welds were checked by x-ray; only the ends of each length of pipe were inspected. But inspection of even a limited area required changing and developing of film, and took too much time.

METALGRAMS

. . . news about "Electromet" ferroalloys and metals

UNION CARBIDE METALS

APRIL, 1960

OPEN-HEARTH SAVINGS — Economies are changing the form in which chromium is added to 4100 and 8100 series constructional steels. Melters are switching to furnace additions of new blocking chrome. Reason: Savings of $1.65 to $2.80 per ton in chromium and silicon costs. The alloy replaces exothermic ferrochrome ladle additions and provides all the silicon needed for blocking. Your Union Carbide Metals representative will be glad to give you additional information.

* * *

FASTEST-DISSOLVING FERROCHROME? — Stainless steel melters continue to be impressed with the rapid solubility of the new "Simplex" low-carbon ferrochrome. In a typical test, 3,300 lbs. of the alloy (7.7 per cent chromium added) dissolved in a 15-ton heat after refurnacing in less than 25 minutes. In addition, 500 lbs. of "Simplex" ferrochrome added to the ladle during refurnacing dissolved before the ladle was half full. Get further information in a new six-page folder, F-20,119.

* * *

COLORS AID IDENTIFICATION — Bags of 50 per cent ferrosilicon, standard and medium-carbon ferromanganese, and calcium-silicon are now color-coded for fast identification. Melters report 10 to 15 per cent higher recoveries with bagged alloys in the ladle, cutting alloy costs. In addition, bags give closer control over specifications, cut handling losses, and aid inventory control. Union Carbide M-tain produces 11 alloys in bags. For folder and chart showing bag specifications and colors, write for F-30,121.

* * *

QUALITY IN QUANTITY — Each of the more than 100 "Electromet" ferroalloys and metals is carefully inspected during every step of production. The aim: To make sure that each alloy meets close chemical specifications consistently. Samples are taken during raw material preparation, furnacing, sizing and crushing, packing, storage, and shipping. During an average month at Union Carbide Metals' Marietta, Ohio, plant, more than 30,000 tests are made on over 10,000 samples. For further details, ask for the Summer 1959 issue of UNION CARBIDE METALS REVIEW.

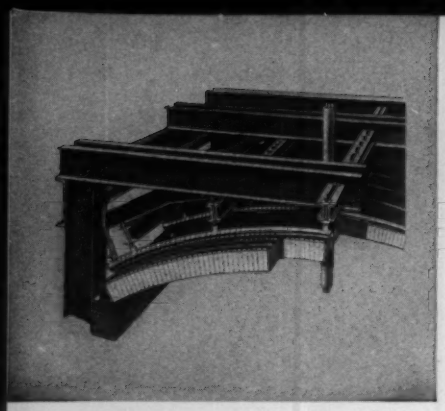
* * *

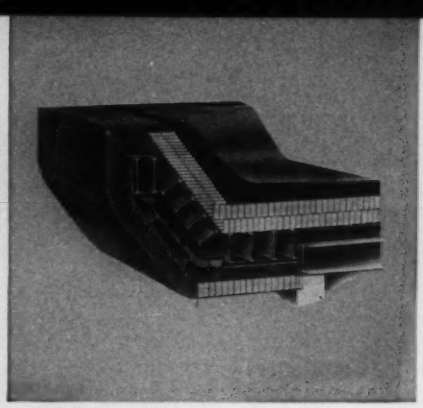
SAVINGS GROW WITH FERROMANGANESE-SILICON — Several stainless melters have reported that using ferromanganese-silicon for slag reduction has increased the recovery of chromium from the slag. A drop of as much as 4 per cent in the chromium oxide content of the slag has been reported. In a melter charging 22 per cent chromium, a one per cent chromium recovery means a saving of 2.4 lbs. of chromium per ton as low-carbon ferrochrome, worth about 75 cents per ton. These savings are in addition to those previously reported — $4 to $8 per ton for 200 series stainless and $6.75 to $11.75 per ton for 300 grades. Further facts are in a four-page folder, F-20,095.

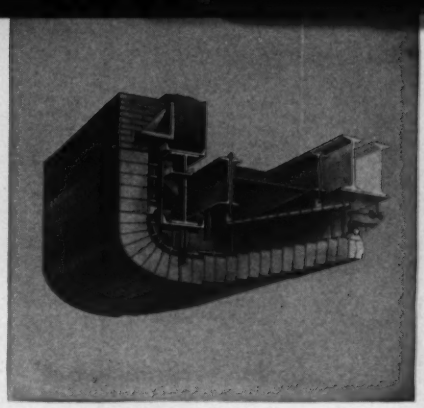
* * *

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. In Canada: Union Carbide Canada Limited, Toronto.

"Electromet," "Simplex," and "Union Carbide" are registered trade marks of Union Carbide Corporation.







❶ HELD-UP, HELD-DOWN ROOF

- No roof centers to install.
- Easily hot-patched—Brick layers do entire job. No welding, no cutting.
- Pipe-supported—No special supporting members required.
- Inexpensive hangers—Simple, one-piece wire.
- Standard wedge brick—Wider bearing surfaces. More stability.

❷ INTERCHANGEABLE SUSPENDED CHILL WALL

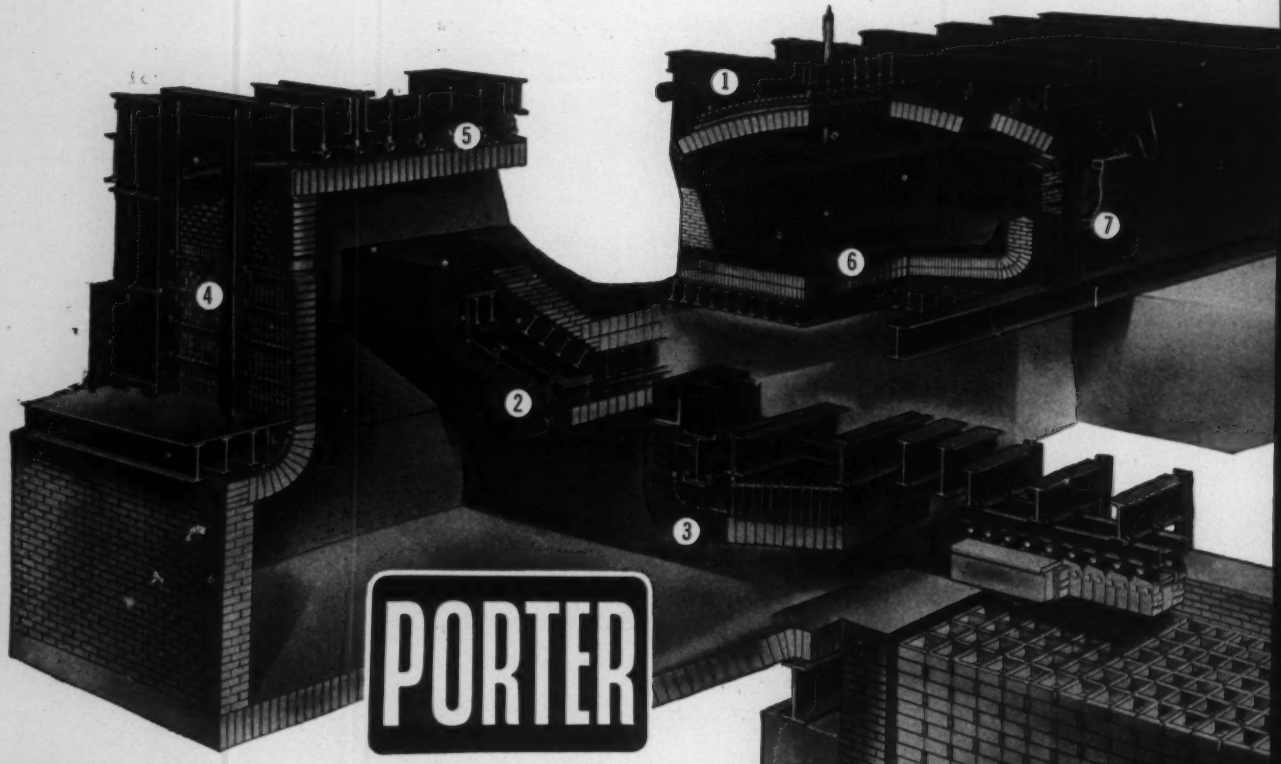
- Low cost, simple installation—Adaptable supporting structure.
- Greater expansion flexibility—Tile engaged on bed joints.
- Safe load distribution—Self-supporting castings.
- Tightly sealed joints—Tongue-and-groove clay tile.

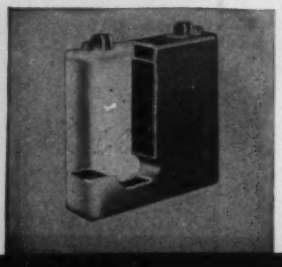
Brick recommended: Either MC-70 Cladex or interchange with Peerlac, 60% alumina.

❸ INTERCHANGEABLE FAN TAIL

- Pipe-supported—Easily replaced with standard mill supply stock.
- Low-cost, simple installation—Adaptable supporting structure.
- Greatest strength—Fabricated steel nose supports.
- Higher heat resistance—Alloy hangers.
- Tightly sealed joints—Tongue-and-groove clay tile.

Brick recommended: Either MC-70 Cladex or interchange with Peerlac, 60% alumina.



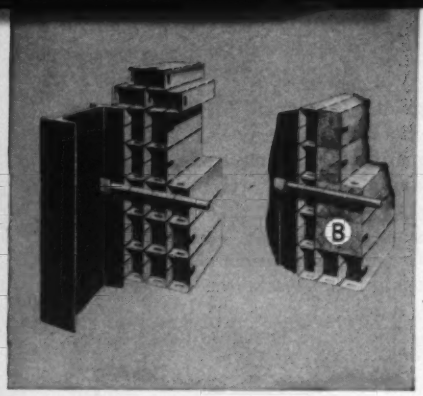


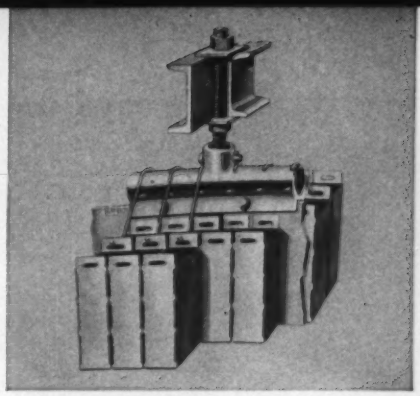
❼ WATER COOLED OPEN HEARTH DOOR

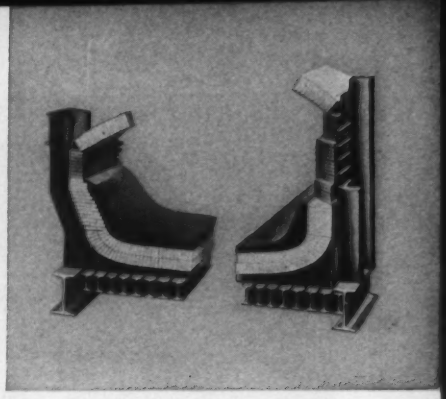
- Long life—Easily installed, easily replaced.

Recommended: Porter Plastikrom for door lining.

* Patents applied for
† T.M. applied for







4 ENDWALL CONSTRUCTION

- Air-cooled tabs (4 sides of brick)—More heat conduction for more efficient cooling.
- Refractory reinforcement for hot spots—Extended casings* permit adding refractory material on cold face (B) as hot face wears.
- Cladding with Porter Cladex†—Dimpled construction of casings provide mechanical spacing for expansion.
- Basic strength—Porter construction eliminates need for tie plates.
- Ties and pipe easily reclaimed.
- Simple one-piece hangers—Wall can be dismantled without cutting or burning.

Brick recommended: MC-70 Cladex or other specified chrome and magnesite compositions.

5 AIR CLEANED, AIR COOLED*, TAB SUPPORTED ROOF BRICK

- Built-in air cleaning—Covers entire roof. No hand blowing.
- Controlled cooling over any area—for controlled wear.
- Tab support—Simple, inexpensive.
- Air-cooled tabs—More heat conduction for more efficient cooling.
- Positive support—Tie plate anchored to pipe.
- Inexpensive hangers—Simple, one-piece wire.
- Notched tie plates—Slip into place. Easily installed or replaced.

Roof brick recommended: CM-40R Cladex or other specified chrome and magnesite compositions.

6 HEARTH CONSTRUCTION

- Monolithic subhearth—Formed by Subhearth Kromform. Easy to install. Perfect conformation.

Brick recommended for inverted arch bottom: Porter M-90B, or other specified chrome and magnesite compositions.

Ramming mix recommended for working bottom: Porter Magnaram 95 for highest MgO content. Or Magnaram 85.

Brick recommended for back wall: MC-70 Cladex. Also other burned and unburned chrome and magnesite compositions.

Brick recommended for front wall: MC-70 Cladex in standard and special jamb brick. Also available burned or unburned chrome and magnesite compositions.

Announcing the Porter All-Basic Furnace—industry's most advanced all-basic open hearth roof

both suspension and refractories by Porter

It's here in detail . . . the Porter All-Basic Open Hearth!

A new concept in roof and endwall suspension employing the present fundamental construction now in use. Both incorporate a new, *all-metal cladding* method to provide proper expansion allowance throughout the entire system.

The suspension system and the basic refractory materials are designed to work together . . . no guesswork regarding either. There is no division of responsibility; Porter is your complete source.

For more information write *Refractories Division, H. K. Porter Company, Inc., Porter Building, Pittsburgh 19, Pa.*

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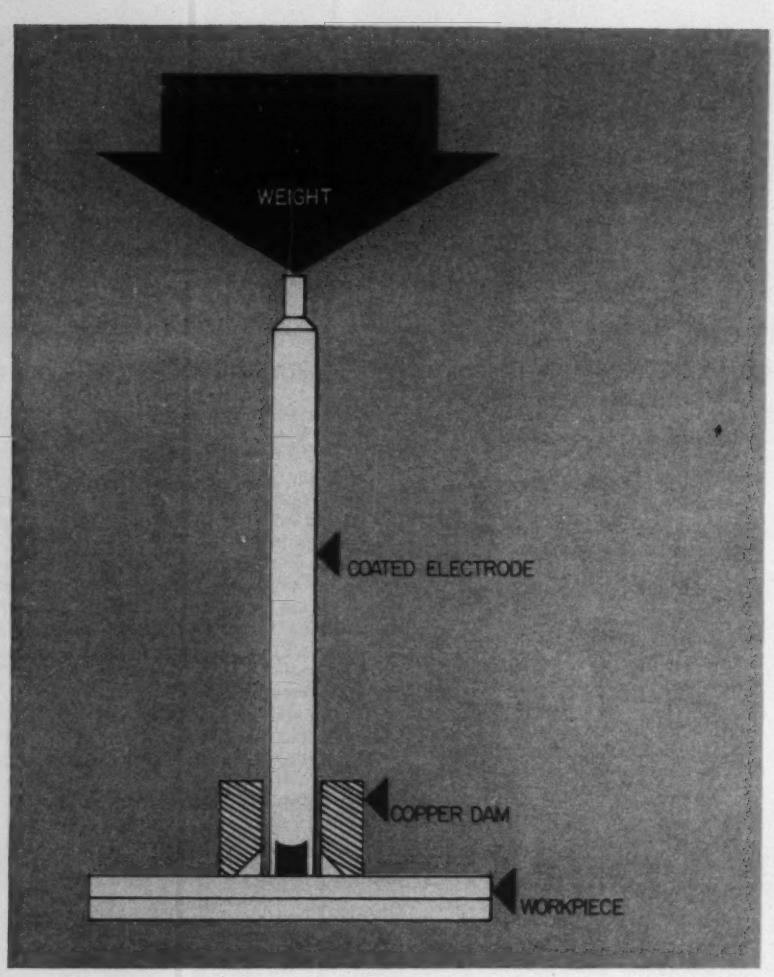


Power applied to electrode starts arc between wire within coating and grounded workpiece. Copper dam helps shape rivet head by confining molten pool

Russians Weld Rivets With Coated Electrodes

Several thicknesses of structural plates can be economically joined with a burnthrough method which leaves a strong, rivetlike deposit. Sizes can be varied

HERE'S A TIP from the Soviets: Join structurals with rivet welding.

It's relatively quick and eliminates drilling. Deposits are free of voids and porosity. The process is said to be especially successful for large lattice work structures such as trusses, girders, and power line supports.

• The Russians say the technique is an improvement over the former method which relied on a submerged arc flux and an uncoated electrode. Several thicknesses of metal can be joined.

The machine is a little like a drill press (see illustration). A shaft passes vertically through guides or rollers. At the bottom, a chuck holds the power cable and a manual coated electrode. The top has a place for weights of various sizes. A simple ring is used as a stop. In use, the electrode passes through a copper ring placed against the workpiece (it serves as a dam).

You begin by mounting a regular coated electrode. Once an arc is struck, it starts to fuse a hole in the surface of the workpiece—no drilling is needed. The process takes place in two stages: Piercing and refilling which follows automatically.

The arc forms a molten pool bounded on top by the electrode, on the sides by the electrode coating. A stream of hot, ionized gases passes from the electrode and builds up a pressure which forces molten metal and flux to the surface. That creates a seal around the electrode, maintaining internal pressure.

As the electrode penetrates deeper, more metal is exposed to the arc, permitting rapid penetration at fairly low currents. When it has reached a preset depth, the stop prevents further downward movement and starts the refilling stage. Arc length gradually increases until it reaches the workpiece surface. Metal previously melted is again melted, forming the rivet head reinforcement in the copper ring mold.

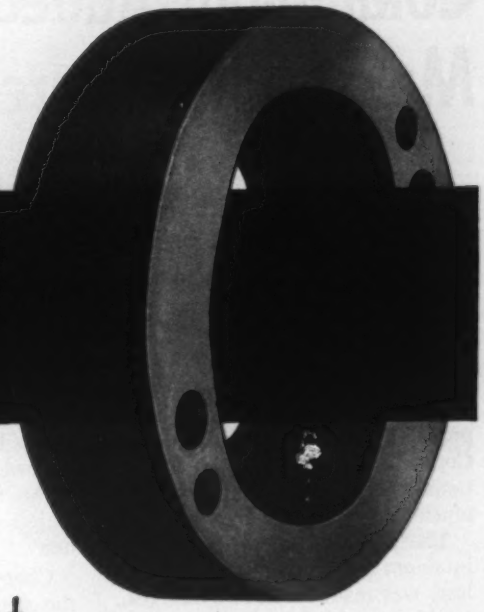
• Main things you need to watch, says the Russian source: 1. Electrode type and size (don't use acid types). 2. Current. 3. Electrode consumption (controlled by the stop). 4. Load or weight on the electrode. 5. Size of copper ring mold.

The Russians have worked with 3/16 in. and 1/4 in. electrodes. Power supply is a conventional 100 ampere transformer fitted with high frequency starting equipment. An automatic timer shuts off starting current within 1.5 to 2 seconds.

Rivet diameter is controlled by electrode size—the stronger the rivet, the larger the electrode must be. A large current and high electrode consumption speed the process.

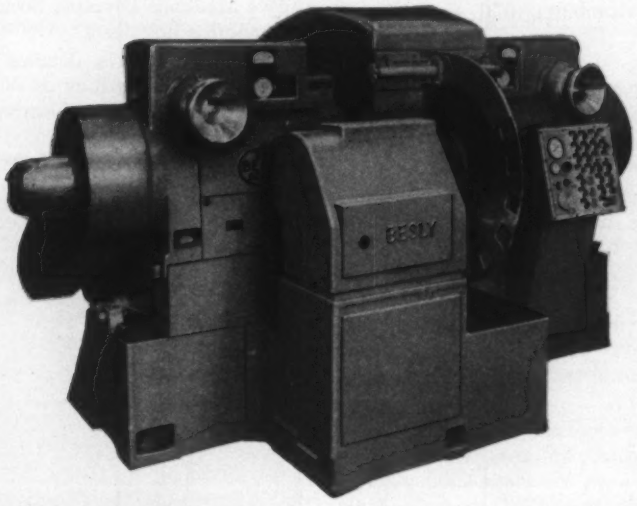
One researcher tested the strength of the rivet produced by joining a 3 in. mild steel angle 5/16 in. thick to a 3/8 in. plate 5 3/4 in. wide. It held 4 tons. The weld failed in shear.

Ground to ± .0001" of size!



A dense cast alloy PUMP RING, 2½" dia. x ⅛", finish-ground at 300 per hour by a BESLY DH4 grinder. It gaged out to ±.0001" and .000050" for flatness and parallelism. Stock removed was .0015". The ground faces checked out at 12 micro-inch finish.

If your grinding equipment can't turn out such results...**Better see Besly!**



BESLY DH4 double horizontal spindle disc grinder. Has *exclusive* precision quill and clutch infeed that provides feed increments calibrated in *millionths.* Abrasive discs can be changed in 30 minutes without disturbing setup, *cutting downtime in half.* Dressing time is only four minutes, *1/5 the usual time!* Simplified push-button operation and controls, built-in dials, gages and meters to indicate abrasive conditions, movement and alignment, motor load, etc., assure precise results, dependable grinding production.

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Columbium Added to Steel Makes Pipe More Weldable

Pipelines installed in subzero weather don't require preheating, careful cooling, or special welding techniques. High tensile properties suggest other applications

ADDITION of columbium gives high strength and superior weldability to a family of steels being produced by Great Lakes Steel Corp., Detroit, a division of National Steel Corp., for natural gas pipelines.

The first field installation of columbium treated steel pipe, a 5 mile line, was made at Beaumont, Tex., for Houston Natural Gas Co. Pipe fabricated by Cal-Metal Pipe Corp. of Louisiana, Baton Rouge, La., was laid by Houston Contracting Co., Houston.

• The first application was chosen to test the formability, weldability, and dependability of the pipe.

The line had to be laid through a maze of existing lines. It was subjected to extreme bending.

Better weldability than conventional pipe of the same yield strength was reported by H. J. Muckley, vice president of Houston Contracting; it handled like softer pipe. Checking and cracking were minimized.

Use of the pipe permitted a 10 to 15 per cent reduction in welding costs, says Mr. Muckley.

The line has handled natural gas at 700 to 900 psi for six months.

• The steel stays weldable in cold weather pipeline installations.

The columbium treated steels can be welded in subzero temperatures, without special preparation or welding techniques. That should further reduce field welding costs.

Some high strength steels used for pipelines must be preheated for welding, then cooled carefully with elaborate equipment, when temperatures drop below 40° F.

• Columbium increases tensile properties and decreases temperature toughness, but doesn't affect ductility.

The steels, called the GLX-W series by Great Lakes, are fine grained, semikilled, mild carbon steels, treated in the open hearth with varying amounts of columbium.

Chemical composition is about the same as for mild carbon steels of 30,000 to 40,000 psi yield strength. But addition of columbium is said to increase yield strength 15,000 to 20,000 psi, without making the steel harder to weld or form. Typical analysis: Carbon, 0.16 per cent; sulfur, 0.018 per cent; silicon, 0.05 per cent; manganese, 0.75 per cent; phosphorus, 0.009 per cent; and columbium, 0.01 to 0.04 per cent.

• Increased availability of columbium and its use in semikilled steel encouraged more general application as an additive.

Columbium treatment of steels isn't a new idea. But most past use of the metal as an additive has been restricted to killed steels, which are expensive to produce. Until recently, relatively high columbium prices have limited general use of the material by the steel industry.

But economic advantages were anticipated for the steels, because columbium has been used successfully in semikilled steels, and its cost has dropped sharply in the last decade. (Large deposits of the metal have been discovered recently in Quebec.)

• Diverse applications are anticipated for columbium treated steels.

Research and development were aimed primarily at pipeline applications. But excellent weldability and physical characteristics should encourage the use of columbium treated steels in other end products to reduce weight, says W. D. MacDonnell, president of Great Lakes Steel. Suggested uses: Truck frames, highway lamp posts, railroad equipment, and pressure vessels.

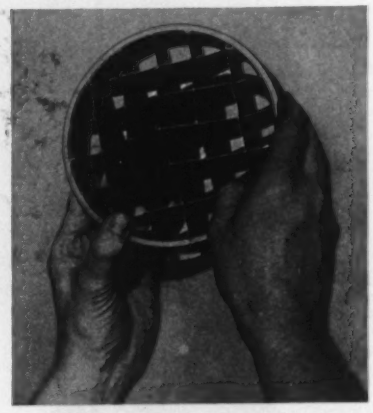
Up Ductility of 17-7 PH

Modifications in chemistry and higher aging temperatures have doubled minimum elongation values of Armco 17-7 PH, says WaiMet Alloys, Dearborn, Mich., which worked closely with Armco Steel Corp., Middletown, Ohio. (Tests on ten recent heats indicate values are now between 11 and 16 per cent.)

The development is said to make the stainless alloy much more useful in investment casting applications. Modified composition gives investment casters a more stable combination of mechanical properties, a feature long sought by airframe and production engineers.

Both WaiMet and Armco Steel are trying to gain a revision in the AMS 5355 specifications and have submitted their proposal to the Aero-Space Materials Division, Society of Automotive Engineers.

You can obtain a detailed copy of test results by writing to WaiMet Alloys, 5320 Oakman, Dearborn 2, Mich.



FLOW STRAIGHTENER, used in a liquid oxygen line that feeds a rocket motor, has vanes that are straight and parallel within ±0.010 in. Stainless steel parts are brazed together in a hydrogen atmosphere furnace at the Montebello, Calif., plant of Stainless Processing Div., Wall Colmonoy Corp.

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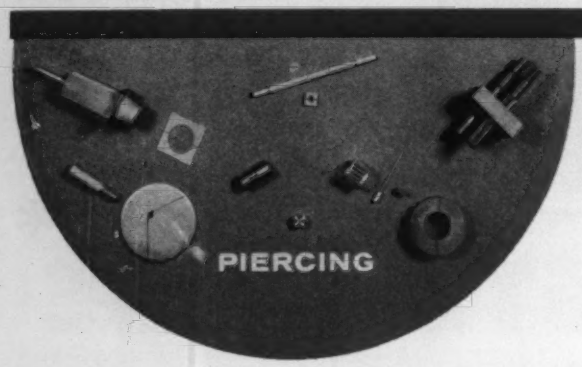
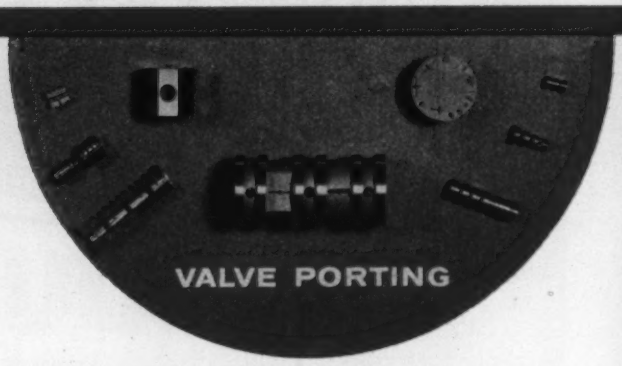
EXPERT SAYS:

Electrical Machining Can Help You



In piercing jobs like these, material hardness is not important, as long as the part conducts electricity



Complex shapes can be used in servovalves and bushings; electrical discharge machining makes them easy

In this article, he sums up what managers should know about the technique by outlining the three major types of processes and citing their advantages and disadvantages

ELECTRICAL machining "is on the threshold of making important contributions to manufacturers," William B. Kane, manager, Elektrojet Engineering Service, Cincinnati Milling Machine Co., Cincinnati, told the Society for Advancement of Management in New York last week.

• **Where does the process apply?**

The question is hard to answer, explains Mr. Kane, because the technique is not like a new machine; rather, it is a new mechanism of metal removal that can lift the limits on conventional machining.

He cites these unique functions:

• Machining metal of any hardness.

• Machining without creating heat or cutting forces.

• Machining metal without tool rotation or without the tool touching the workpiece.

• Machining dissimilar metals without loading the tool.

• Machining odd shapes by plunging a static tool through the workpiece.

Comments Mr. Kane: "Certainly, one of those can create a cost reduction or product improvement in any shop." Here are the major processes:

Electrical Discharge Machining

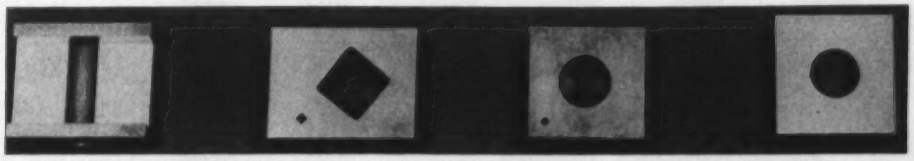
Using the destructive effect of an electrical spark, the process is being used in some cavity and mold machining operations, minimizing the manhours needed to get a part into production.

"Machining of blanking and stamping dies cannot escape the transition from conventional to electrical machining," asserts Mr. Kane. By using the punch as the cutting tool (electrode) with precise control of punch clearance, you can make this type die with up to 50 per cent less manhours. Die life is improved because of consistent punch clearance around the entire perimeter of even an odd shaped punch, or a nest of odd shaped punches. Also, form grinding or surfacing of small lots is deemed practical.

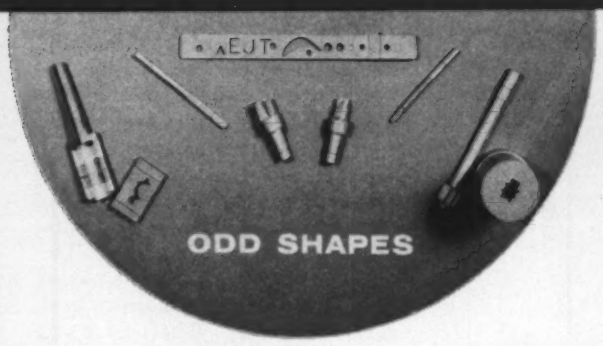
On the debit side, Mr. Kane points out: The machining is slow; you can figure on the removal of 0.003 to 0.010 cu in. of metal a minute for precision machining. Still, you may be able to eliminate operations like heat treating and annealing, deburring, and even construction and assembly hours on dies; those savings may make slow machining well worth the time.

Electrolytic Grinding

This process, described as electrodeplating, applies to flat surface grinding, or high production form surfacing where freedom from burring, smearing, or thermal damage is essential. When the method is applied to metals that normally require diamond wheels, it can provide savings of 70 to 90 per cent, says Mr. Kane. High volume of metal removal and exceptionally low wheel wear are strong points. He feels that outside diameter and inside diameter grinding must be included as potential fields for the process.



ELECTRO-CHEMICAL MACHINING handles "unmachinable" materials at good removal rates. Example (sinking hole in Stellite ring): Drilling took 216 minutes; discharge machining, 90 minutes; electro-chemical machining, 15 minutes



Odd shapes, in either hard or soft metals, are used for shaving dies, punch dies, plastic mold dies, special parts

The capability of electrical machining on unusual geometries has led to some special product designs

On the debit side, Mr. Kane lists: The corrosion from electrolytic salts; and grinding is most successful when applied to large areas of work-wheel contact.

Electro-Chemical Machining

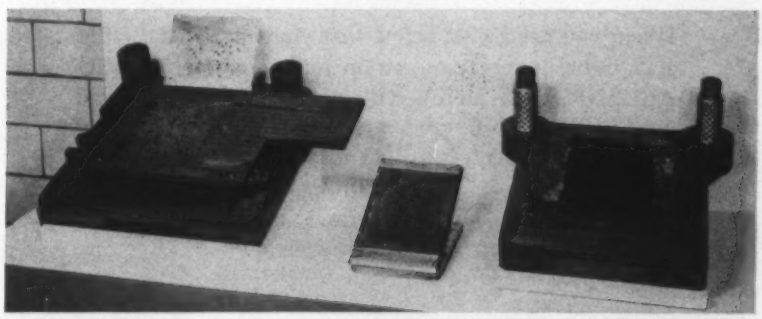
This, the newest of the processes, applies mostly to making round, through holes in "unmachinable" materials and in roughing odd shaped holes. It applies more to hole sinking than to making cavities, although Mr. Kane feels that simple, nonprecision cavities are potential applications.

Disadvantages he names include: The hazard of holes breaking through into irregular surfaces, lack of precision on odd shaped holes, and a limited field—machining holes in difficult materials. (For another variation of this process, see STEEL, Apr. 4, p. 142).

Summary

The introduction of electrical machining in the toolroom, the model shop, and the development laboratory, can lower costs, reduce lead-time, save manpower, and offer a new degree of freedom in product design, says Mr. Kane, adding:

In evaluating die cavities, Mr. Kane feels the type at right is probably best suited for conventional sinking. The shape at left is ideally suited for electrical discharge machining. In the center, a contour where both processes could combine to cut machining time



This stamping die has 512 punches. The punches, die plate, stripper plate, and a finished part are shown. Savings of up to 50 per cent can be achieved on this type application

In production applications, you may be able to reduce the number of process operations, rework scrapped parts even though they are hardened, get odd shaped holes, cut diamond wheel costs, and eliminate some tooling problems like tool chatter and cutter breakage.

Mr. Kane feels that electrical machining, through its three fundamental approaches, has a potential that can help industrialists meet the challenges of new, high precision products made from new materials.

• If you'd like to have a copy of this article, write to Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. You may win $1000 by using material like this in STEEL. For details, see the Servicenter, Pages 5 and 6.

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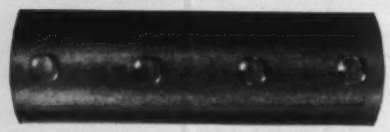

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Small Mill Cuts Slots Quickly, Accurately

TIME AND LABOR savings have been reported by Non-Linear Systems Inc., Del Mar, Calif., in the production of slotted parts for digital readout systems. The gang milling is done by a small mill (a No. 1 U. S. milling machine), which, the company says, "has all but replaced three of the older milling machines and does the job approximately six times faster." The digital readout provides readings directly in self-illuminated, numerical form in Non-Linear's instruments for industry and missiles.

The U. S. mill is equipped with an air hydraulic table feed. The operator inserts six parts in a special clamp and turns its handles to hold them in place. That takes 20 seconds. The start button is pushed; the table feeds and returns. One complete feed cycle takes 1 minute and accurately cuts 14 slots in each piece.

Twenty-eight 4 in. diameter slot cutters are mounted on a common arbor to complete the gang milling in one pass. Spindle speed is 2000 rpm. With the increased production rates, six pieces can be processed in 100 seconds.

The California manufacturer is planning to use the small mill to speed the making of small plexiglass rectangles; multiple cuts could be made in one pass.

Automatic Can Line Makes Up to 450 Units a Minute

Only one operator and one maintenance man are needed to produce up to 450 finished, tested can bodies per minute on a line tested at the E. W. Bliss Co.'s Can Machinery Div. manufacturing plant at Hastings, Mich. It turned out 2 million cans before shipment.

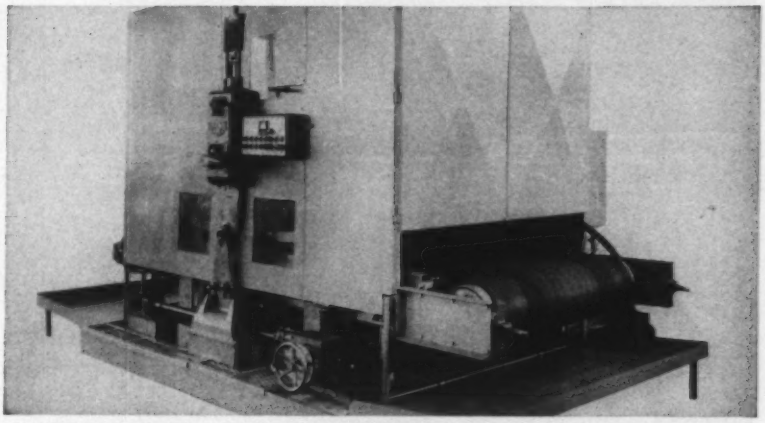
The Bliss 603 Universal Bodymaker used in the line can produce a large range of can sizes. The operator controls the duplex slitter, transfers the body blanks to the bodymaker and keeps the double seamer supplied with ends. The transfer of can bodies from the bodymaker through flanging, double seaming, and testing is done automatically.

Belt Grinder Finishes Honeycomb Accurately

THICKNESS tolerances of ±0.001 in. can be held on the Mattison No. 458, conveyorized, abrasive belt, grinding machine. The unit has a diamond shaped head that flexes the belt as it drives.

Applications include finishing honeycomb, sheet stock, small parts (such as motor laminations), and similar high production flatwork requiring critical thickness tolerances.

The grinder accommodates a 36, 48, 60, or 72 in. belt. Small parts of any size can be ground. The manufacturer says pitch limitation has been eliminated. You can control bed rapid traverse up and down by pushbutton or handwheel. Automatic upfeed increments from 0.0002 to 0.0005 in. per impulse are available to compensate for belt wear or part size. Gaging and depth setting are manual.



Conveyor speed can be varied from 6 to 60 ft per minute. The unit can be supplied with a single head for reciprocal or single pass grinding or with multiple heads and straight through conveyor. All machines are equipped with central lubrication and a separate coolant system.

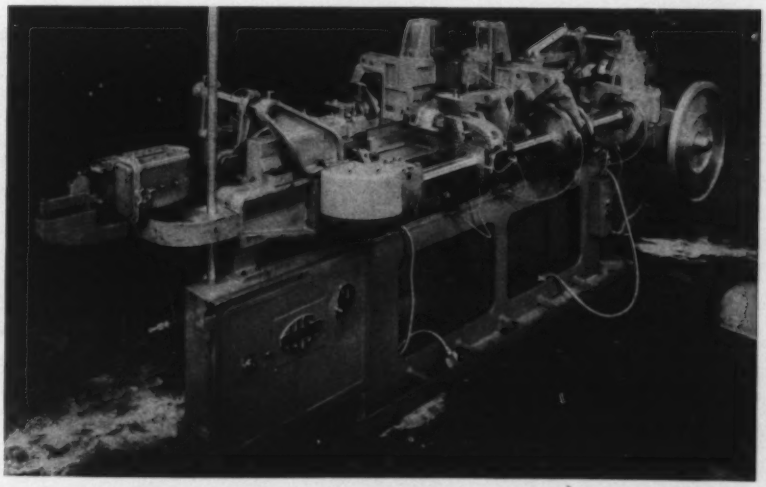
For further information, *write* Mattison Machine Works, 200 Blackhawk Park Ave., Rockford, Ill.

Double Ended Unit Produces Stampings, Assemblies

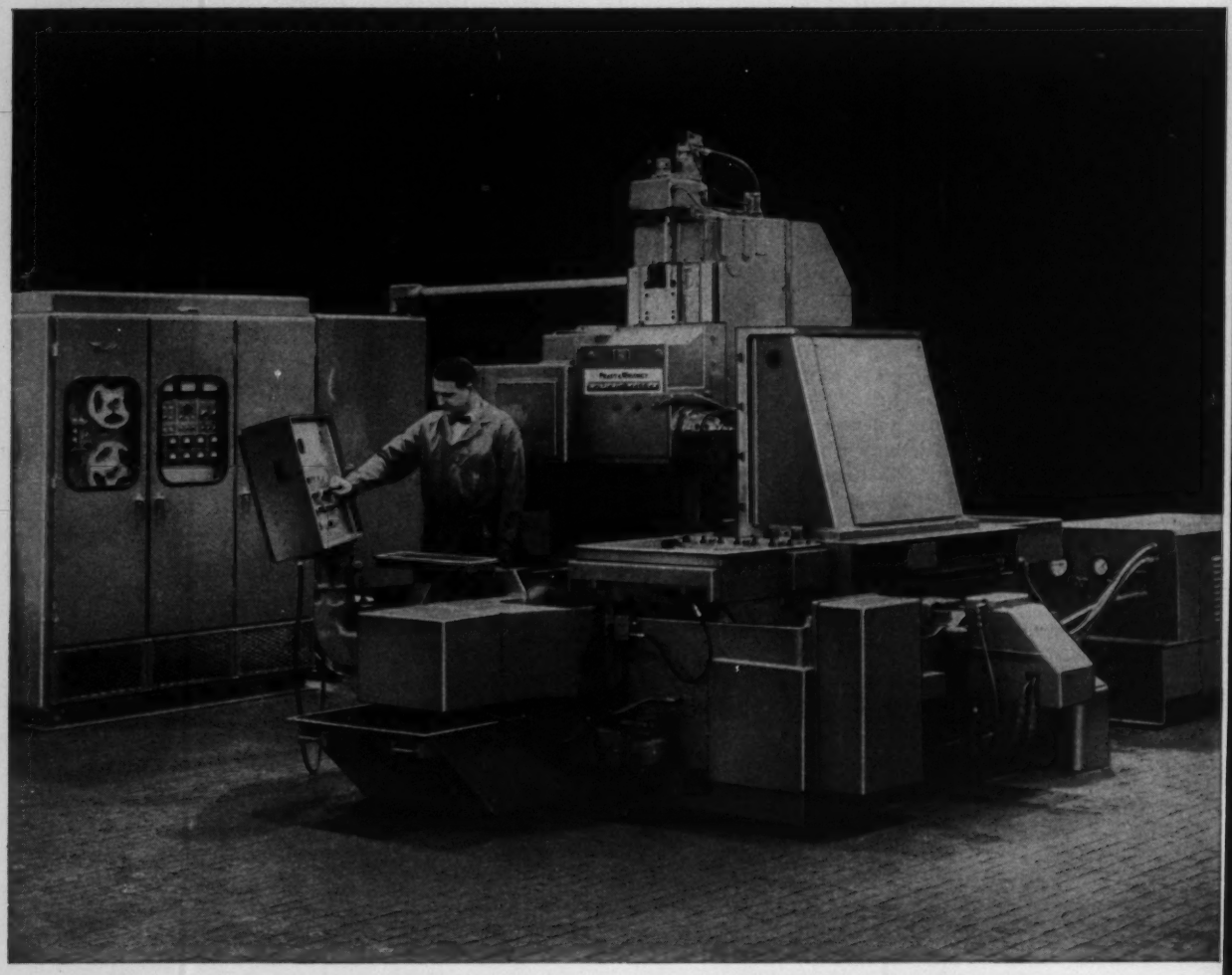
ON THIS double ended machine, stock from coils can be fed at both ends. The arrangement is suitable for fabricating assemblies which could include two stampings (both made and assembled in the machine) or two stampings (made in the machine) and assembled with a prefabricated hopper fed member. The unit can also be used for simultaneously making two different stampings not requiring assembly.

The unit can accommodate material up to 3 in. wide and provide a feed length adjustable up to 6 in. At each end, you get a feed mechanism, a stock straightener, and a stock check.

Other equipment includes a die

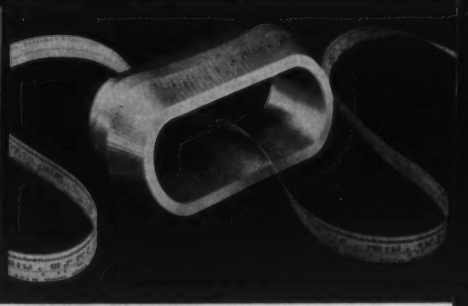


ACCURACY



PER-PIECE PRODUCTION TIME CUT 33% . . . by machining these aluminum computer housings on a Numeric-Keller. Each piece required 12 pockets milled and 72 holes drilled. Scrap loss to date: zero!

ONLY 21.5 HOURS . . . were needed to machine this complicated tool steel missile part on a Numeric-Keller. Machining involved 3 roughing and finishing contour cuts and 4 roughing and finishing pocket milling cuts.



3-DIMENSIONAL MILLING UNDER TAPE CONTROL . . . is demonstrated by this vision block for a super-modern military tank. Geometry is quite complex. Tape was prepared using both computer and hand computations.

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TOOLING COSTS and LEAD TIME CUT AS MUCH AS 75% . . . because the P&W Numeric-Keller is equipped for continuous-path milling under the direction of a tape-reading numerical control system. Models, templates and other costly, complicated tooling are eliminated!

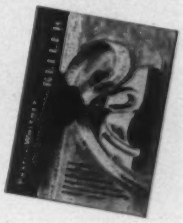
EXTREME ACCURACY . . . with overall production easily held to ± .001". Piece-to-piece reproduction accurate to "tenths" is possible with controlled cutter selection.

UNUSUAL VERSATILITY . . . with more different types of jobs done faster and better. Short and long runs are handled with equal efficiency. Using tape, changeover is fast and easy, with minimum time lost between jobs.

MACHINE UTILIZATION IS GREATLY INCREASED . . . because more time is spent making chips, with less time needed for setup, fixturing and other non-productive operations. Similarly, man-hours are made more productive.

MACHINING TIME IS SLASHED . . . because tape control means maximum speeds and feeds programmed through all phases of the machining cycle. Optimum machining practice at all times also means finer surface finishes.

SEND NOW FOR THE CASE-HISTORY FACTS . . . that show how the P&W Numeric-Keller has saved *HOURS* of setup, tooling and machining time on dozens of jobs like the 3 examples shown on the facing page. See how this revolutionary machine can produce equally important savings on the toughest milling jobs in YOUR plant. Write today for your copy of Circular No. 624, that includes Job Analysis Sheets to give you the dollars-and-cents facts on Numeric-Keller savings. Pratt & Whitney Company, Inc., 13 Charter Oak Blvd., West Hartford, Connecticut.



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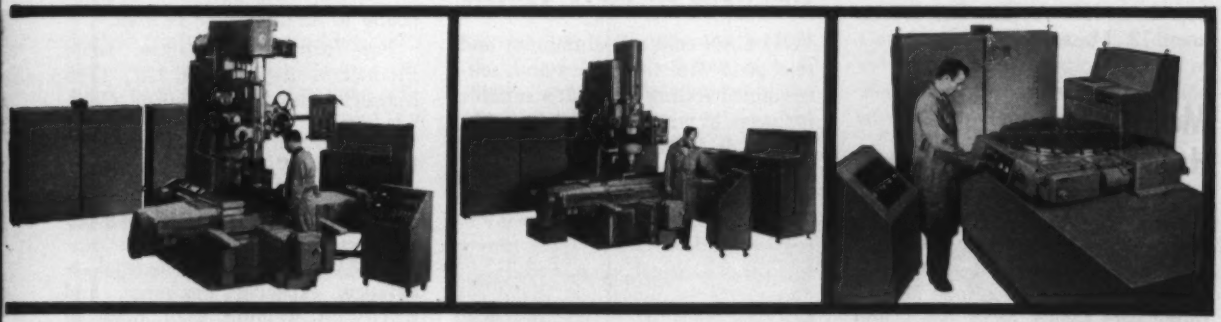


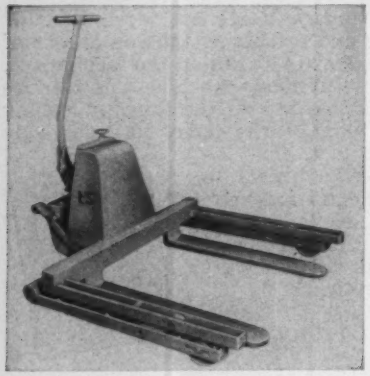
OTHER P&W NUMERICALLY CONTROLLED MACHINE TOOLS . . . include the Jig Borer, Vertical Precision Hole Grinder, and Precision Rotary Tables. Providing settings accurate to .0001", made automatically from data supplied by punched tape or operator keyboard, the Jig Borer and Hole Grinder combine toolroom precision with production-line speed and ease of operation. Equally efficient for short- or long-run production work. Ultimate in speed plus precision in circular spacing, graduating, and angular positioning, the Pratt & Whitney Numerically Controlled Rotary Table provides automatic settings accurate to 5 seconds of arc!

head (ram at each end); one common, four slide forming position, including stripper with double motion; automatic lubrication system; air clutch brake; and a 7½ hp variable speed drive.

For further information, *write* U. S. Tool Co. Inc., Ampere (E. Orange), N. J.

Hydraulic Foot Lift Truck Has 2000 lb Capacity

LOW underclearance pallets and skids can be handled by a foot lift truck developed by Lewis-Shepard. The straddle type unit is hydraulically operated. Capacity is 2000 lb. The unit can be equipped with



forks for 48 in. load lengths. The forks (5 in. wide, 36 in. long) can handle open face or double face pallets. The straddle base arms may be held to a 3 in. width.

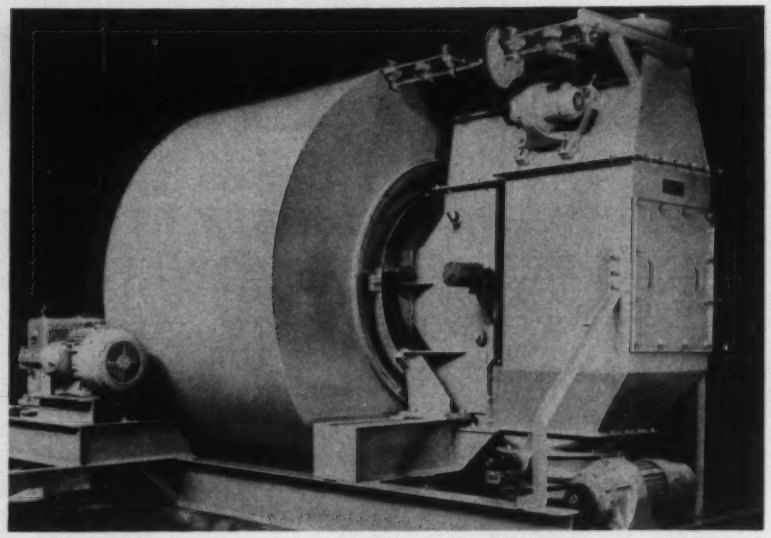
For further information, *write* Dept. R10-7, Lewis-Shepard Products Inc., 125 Walnut St., Watertown 72, Mass.

Motors, Generators Have Design Improvements

AN EXTENSION in frame sizes affects GE's Kinamatic industrial motors, generators, and motor-generator sets. It includes four NEMA frame sizes (584A, 585A, 683A, and 684A) and results in 28 new dripproof motor ratings and 14 dripproof generator ratings.

Design improvements include an integral cast main field coil and pole assembly providing greater protection and improved heat transfer. The complete pole and coil assembly can be replaced as a single unit without replacing spring clips and spring washers.

For further information, *write* Direct Current Motor & Generator Dept., General Electric Co., Erie, Pa.

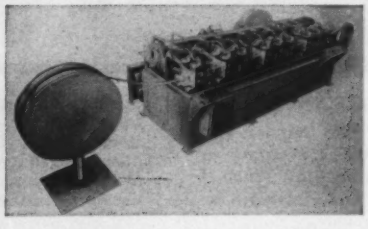


AUTOMATIC ROTARY BLENDER AND HOPPER forms a processing bridge by blending materials as they come from other processes and introducing them directly into the next step. A supplemental hopper holds other ingredients to be introduced into the succeeding process. Blender capacities range from 500 lb to 20 tons. Moving parts and controls are motor driven or cylinder actuated. The process is controlled from one panel. The unit is on a movable bed. For further information, **write**, Sturtevant Mill Co., 1 Harrison Square, Boston 22, Mass.

Nine Stand Rolling Mill Has Rolls on Close Centers

YOU CAN cold roll aluminum and steel strip with this nine stand, self-contained rolling mill. It's suitable for users of strip up to 12 in. wide. Length is 10 ft.

The rolls are mounted in bearing blocks pulled together by hydraulic



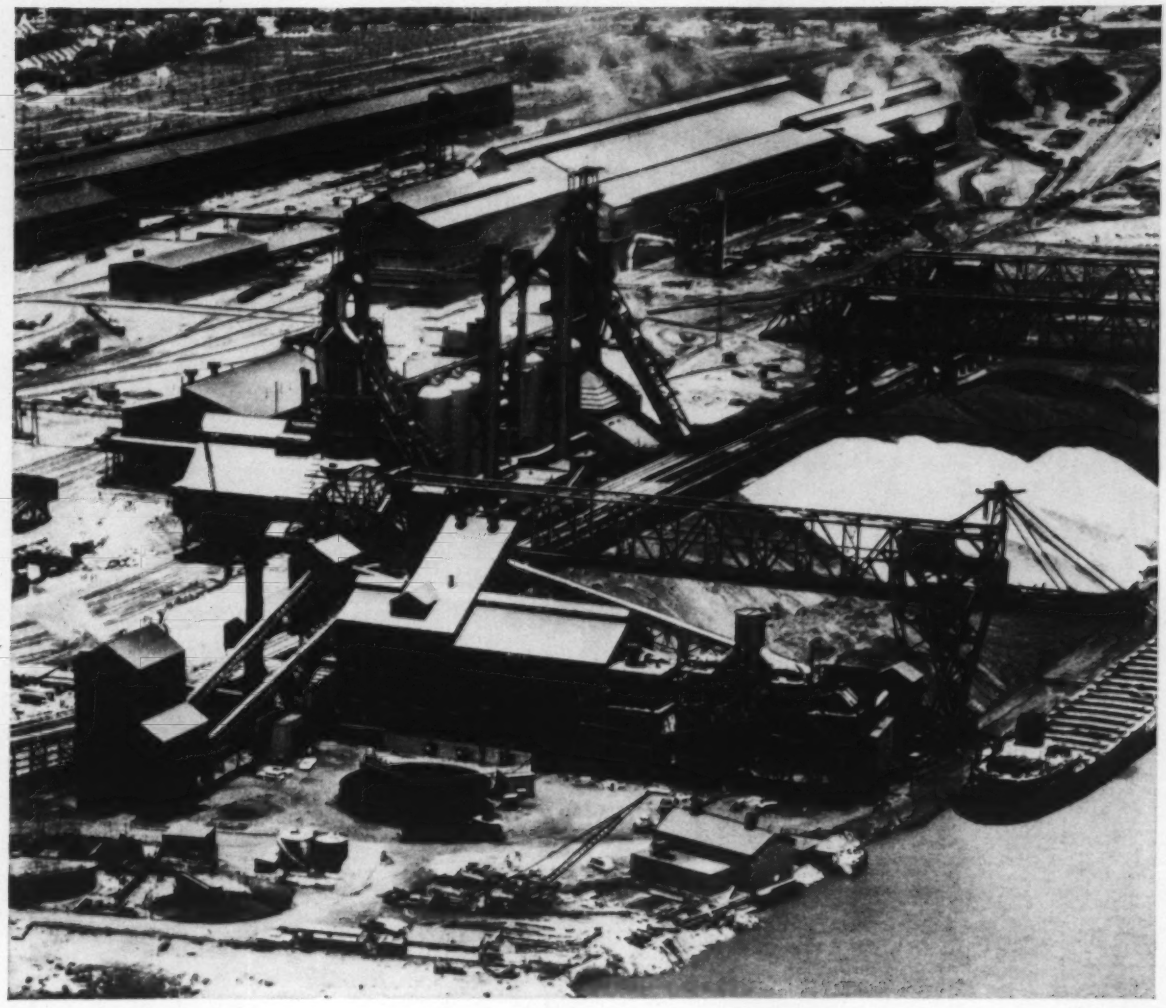
cylinders. Dual synchronized screws are used to push the rolls apart for regulating the gage of material to be rolled.

The elimination of roll frames makes possible a tandem mill with roll frames set on close centers. That reduces over-all dimensions and simplifies power transmission to the rolls. Roll location is rigid and accurate. Hydraulic loading protects the bearings or drive train from overloading. The rolls may be raised hydraulically for threading or clearing and returned hydraulically to original gage settings.

For further information, *write* Production Engineering Co., 1795 Massachusetts Ave., Riverside, Calif.

Welding Control, Power System Lessen Weld Marks

THE ADVANTAGES of normal resistance, capacitor discharge, and percussion welding with none of their disadvantages is claimed for a welding control and power system made by Robotron Corp. Weld marks are minimized. The company says the need for final metal



2100 tpd sinter plant at McLouth Steel

in full production 2 weeks after start-up

Featuring the first Dravo Lurgi straight-line induced draft cooler in United States, McLouth Steel Corporation's new sinter plant at Trenton, Michigan, will produce self-fluxing sinter. The time-span of two weeks from the beginning of pilot operations to full production is believed to have set a record. This plant and a second now under construction will be used primarily for agglomeration of Lake Superior ore fines and reclamation of a five-year accumulation of flue dust.

Each sinter machine is a continuous strand type with 77 eight and a quarter foot wide pallets. Length is 111½ feet with a suction area of about 700 square feet. Speed of the strand may be varied from 6½ feet to 17 feet per minute. Coolers for each machine will handle 2500 tons of sinter per day, and reduce the temperature of sinter so that it can be conveyed on rubber belts.

Under an exclusive licensing agreement with Lurgi Company, Dravo designs, manufactures and constructs sinter plants, machines and coolers. Write or phone Dravo Corporation, Pittsburgh 22, Pennsylvania, for information on this or any of the other Dravo products and services for the steel industry.

DRAVO
CORPORATION

Blast furnace blowers • boiler and power plants • bridge sub-structures • cab conditioners • docks and unloaders • dredging • fabricated piping foundations • gantry and floating cranes • gas and oil pumping stations • locks and dams • ore and coal bridges • process equipment • pumphouses and intakes • river sand and gravel • sintering plants • slopes, shafts, tunnels • space heaters • steel grating • towboats, barges, river transportation

J&L leaded steel bar stock was one of the major factors in lowering cost per piece in COMAPRO metalworking cost analysis project to develop optimum machining methods. Project officials report consistently excellent machinability.

Final COMAPRO tests prove . . .

J&L leaded steel bars are a key factor in cutting production time 30%

Excellent machinability of J&L Type A leaded cold finished bars has been proved by the widely recognized cooperative machining program conducted at Cone Automatic Machine Company, Inc., Windsor, Vt.

COMAPRO's final report covered a period of many months of tests on the machining of spark plug shells under scientific laboratory-controlled conditions.

It highlights these important facts:

1. Production time per machined unit was cut from 6.5 to 4.41 seconds—a reduction of approximately 30%.
2. The tools of the automatic bar machine demand a degree of uniform machinability in the bar stock which J&L Type A leaded steel consistently provided.
3. The free machining quality of J&L leaded steel reduced tool changes.

These results are typical of the benefits many companies have been getting with J&L free-machining steels. In actual production runs, the use of J&L's Type A leaded steel has increased overall output rates 22%, reduced tool costs 50%, and has required less power than making similar parts of conventional steel.

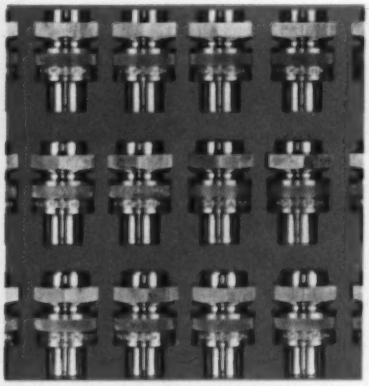
This Steelmark identifies products made of steel. Place this mark on your products. And look for it when you buy.

Steel

Jones & Laughlin Steel Corporation

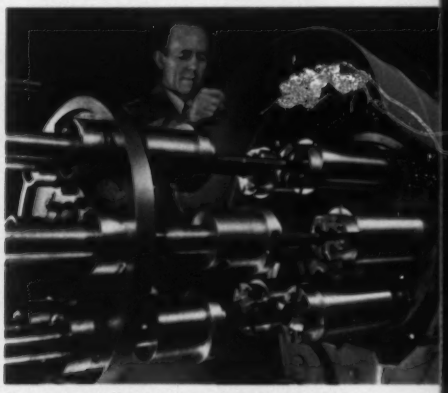
PITTSBURGH, PENNSYLVANIA

Where cold rolled steels originated in 1859



Spark plug shells were selected as typical machined parts for COMAPRO tests. Note superior finish of completed units produced from J&L 13/16" leaded hexagon bar stock.

COMAPRO tests were run on this six-spindle Cone automatic bar machine which permits continuous end-to-end feed of bars from the reel into the machine.



New two-unit feed mechanism developed by COMAPRO provides quieter operation, longer tool life, stock savings, closer tolerances and other important advantages.

J&L STEEL

Six machining steps are required to produce the spark plug shell. Machining cycle time was cut 30%, due in large part to the fine machinability of J&L's leaded steel.

COMAPRO emphasizes well organized tool control; makes use of modern pre-set, quick-change type of holders, with gauges. Result: time for tool changes is greatly reduced.

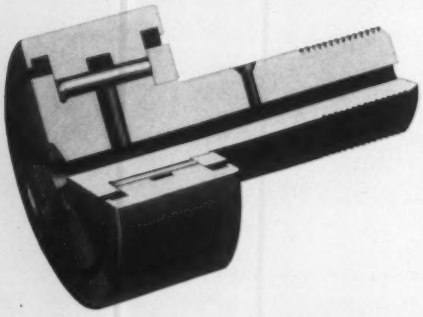
only McGILL® sealed *CAMROL*® cam followers give you . . .

effective sealing

prelubrication

high radial and shock capacity

in a full range of sizes



Effective sealing of the CAMROL cam follower against moisture, dirt, chips, etc. guarantees longer service life . . . reduces maintenance. This sealed construction retains lubricant and eliminates need for frequent relubrication, so often undesirable in cam action, guide support and track roller applications.

Special seals are built in at stud and flange ends. A black oxide finish on all exposed surfaces offers outside corrosion resistance. The channeled reservoir above the rollers in the outer raceway bore helps store reserve lubricant, sufficient in most cases for lifetime service. Relubrication is possible through convenient oil holes. The new SCF sealed CAMROL cam followers interchange with proven standard CAMROL cam followers. Standard stock with roll diameters up to 4″ are available for both stud and shaft mounting.

For maximum bearing life where contamination is a problem, specify sealed CAMROL cam followers. Ask your McGill representative or our engineering department for recommendations.

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engineered electrical products

McGILL®

precision needle roller bearings

McGILL MANUFACTURING COMPANY, INC., BEARING DIV., 301 N. LAFAYETTE ST., VALPARAISO, INDIANA

finishing should be notably reduced if the right procedures and equipment are used.

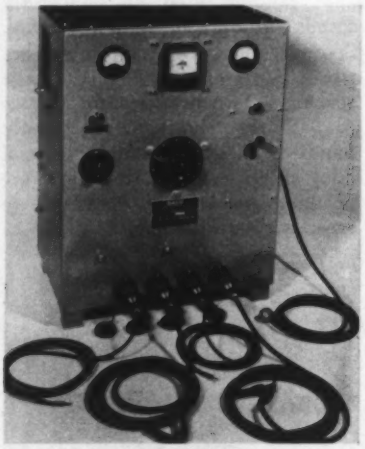
The system uses a coaxial ignitron tube contactor, capable of handling high peak currents for short periods without misfiring or breaking down. Transformer size requirements have been reduced. Little latent heat is left in the parts. They can usually be handled with bare hands immediately after welding.

See it at the AWS Welding Show or *write* Robotron Corp., 21300 W. 8 Mile Rd., Detroit, Mich., for further information.

Electroplating Power Pack Has More Current Capacity

WITH the new Dalic power pack, you can do simultaneous plating and etching on two workpieces or double output on platingwork requiring the same applied voltage, current density, and time requirements.

In this plating process, tank immersion is not required and selected work areas may be readily plated without extensive masking or stopping off.



The unit operates on 220 volts, single phase, 60 cycles and has an output of 0 to 50 amperes at 0 to 30 volts with stepless voltage control. A special ampere-hour meter is used. The power pack is 32 in. high, 24 in. wide, and 18 in. deep. Weight, complete with leads, is 227 lb.

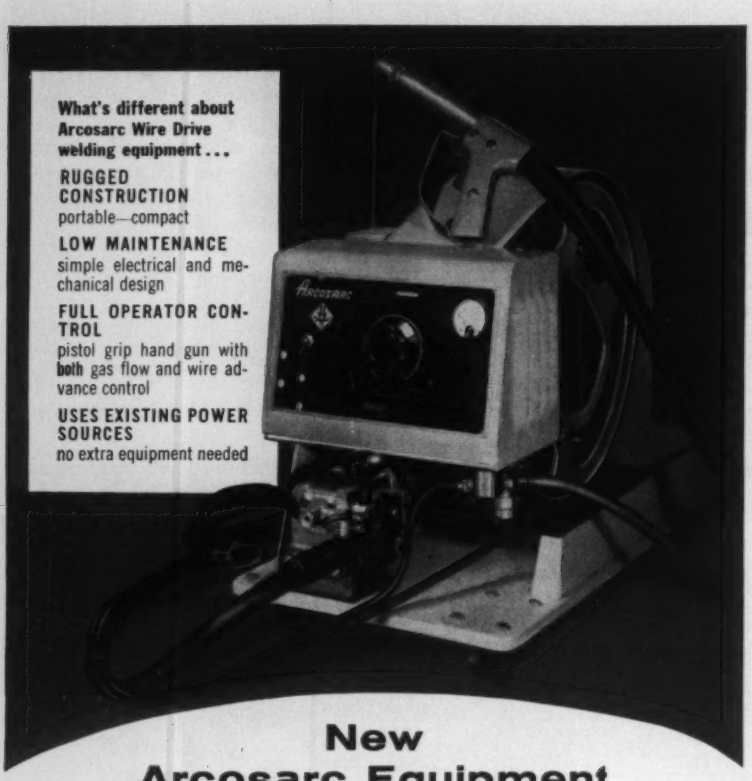
For further information, *write* Sifco Metachemical Inc., a subsidiary of Steel Improvement & Forge Co., 935 E. 63rd St., Cleveland 3, Ohio.

Motor Control Uses Armature Filter System

THE COMPACT, tubeless motor speed control line made by Minarik is a heavy duty type and requires no warmup. Full wave control may be switched from forward to reverse at any motor speed setting. Speed range is 18:1 at full rated motor torque.

Internal relays and a time delay circuit permit reversal in about ½ second with no strain on the motor or control. Silicon rectifiers supply full wave dc to the armature and field circuits. Improved regulation and smoother operation are provided by an armature filter system. An internal terminal strip is included for adaptation of limit switches and a remote, forward-brake-reverse switch.

The unit measures 5¾ in. wide, 9¼ in. high, and 9⅜ in. deep (not

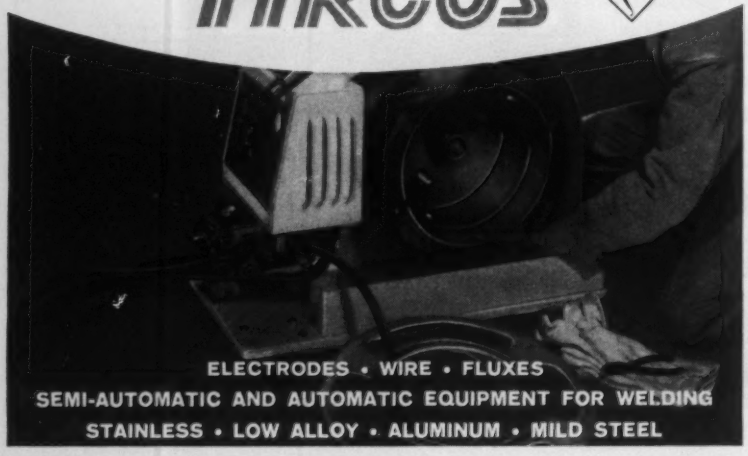

What's different about Arcosarc Wire Drive welding equipment...
RUGGED CONSTRUCTION
portable—compact
LOW MAINTENANCE
simple electrical and mechanical design
FULL OPERATOR CONTROL
pistol grip hand gun with both gas flow and wire advance control
USES EXISTING POWER SOURCES
no extra equipment needed

New Arcosarc Equipment

—for CO_2 welding of Mild and Low Alloy Steels
—for inert gas welding of Aluminum and Stainless

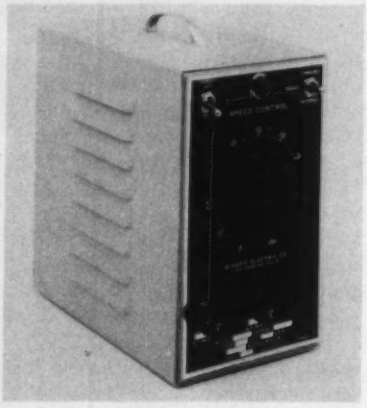
Here is a "bonus producing" wire feed unit for a variety of welding jobs in pipe, pressure vessel, structural steel fabricating shops, and foundries. Full instant control in the hand gun of the wire feed and gas flow along with the open arc give the welder the fullest opportunity to produce high quality weld metal consistently. Continuously fed wire eliminates stub losses, and the inconvenience of start and stop procedures. For the welder, ARCOSARC equipment improves manual operation; for the fabricator, it helps to keep costs under control.

WELD WITH ARCOS



ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Pa.

NEW PRODUCTS and equipment



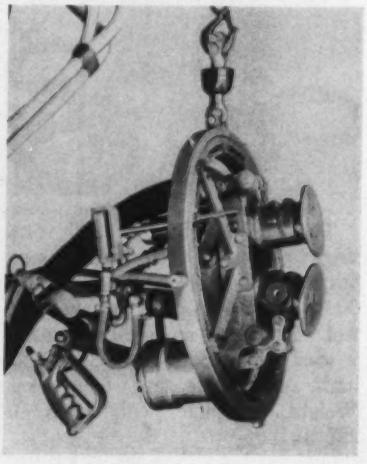
including knob projections). Net weight is 16 lb. You can get models for 115 or 230 volts, 60 cycle input.

For further information, *write* Minarik Electric Co., 224 E. Third St., Los Angeles 13, Calif.

Roll Spotwelder Has High Clamping Pressure

THREE THICKNESSES of metal requiring clamping pressures up to 1000 lb can be handled by the Progressive portable roll spotwelder.

It can be used at production speeds up to 250 in. per minute. Spot frequency is adjustable between ½ and 1½ in. automatic spacing. Two or three thicknesses of 0.032 in. sheets can be easily handled. The synchronized, special alloy drive and contact rollers are available in various diameters to meet work requirements.

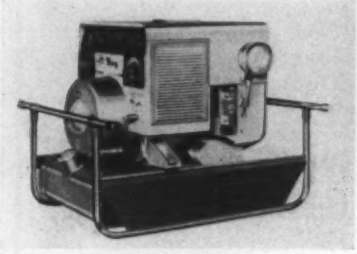


The unit is counterbalanced in a ring type mounting for effortless, universal positioning, both horizontally and vertically.

For further information, *write* Progressive Welder & Machine Co., 915 Oakland Ave., Pontiac, Mich.

Portable dc Welder Has High Auxiliary ac Output

AN EXTRA 2000 watts of auxiliary ac power have been added to A. O. Smith's portable dc welding machine. Total auxiliary power: 3500 watts (60 cycles, and single phase). The engine driven welder has a dc welding output of 200 amperes. It's suitable for E 6010 and other electrodes.



The operator has continuous current control between main tap settings of 45, 55, 70, 85, 100, 115, 135, 155, 175, and 200 amperes with a fine control that delivers exact heat for welds on any metal.

A special generator with start windings in the main generator provides all models with electric starting. Rope start or automatic recoil starters can be furnished.

See it at the AWS Welding Show or *write* Welding Products Div., A. O. Smith Corp., 3533 N. 27th St., Milwaukee, Wis., for further information.

Part Feeder Handles Pieces up to 3 in. Long

UP TO 200 pieces per minute can be handled by the Model FE-103 part feeder. It has a motor driven drum, variable speed control, and is compact for easy installation in dial index or in-line transfer applications. It can operate with Dixon screw drivers, positioners, or other assembly equipment.

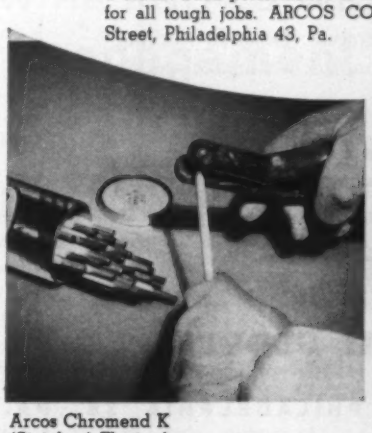
Parts are delivered by drum

Job report courtesy of
Midwest Piping Co., Inc., St. Louis, Mo.

When stainless welds must pass the most rigid tests possible

USE ARCOS QUALITY FILLER METALS

This 16" diameter Type 304 stainless elbow is part of the reactor cooling system in an atomic powered ship. In welding the two halves, the first pass was made with Arcos Chromend K (Type 308) electrodes. The balance of the joint was submerged arc welded with Arcosite Bonded Flux and Chromenar K (Type 308) wire. The inset shows results of a dramatic test of the Arcos weld metal so produced. A 2½" ring, cut from an elbow, was given the normal bend test—and then completely flattened—without a crack! Such performance is the reason why Arcos is preferred for all tough jobs. ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Pa.



Arcos Chromend K
(Stainless) Electrodes

Arcos Chromenar K Bare Wire
and Arcosite Bonded Flux

Jomac gloves stand up under treatment that even expensive leather gloves couldn't take!

The test shown above, in which a razor blade is drawn sharply across a Jomac glove without ill effect, shows the remarkable cut resistance of Jomac's loop-pile fabric . . . *protection that even leather doesn't afford.*

Moreover, Jomac gloves *wear longer* than leather gloves and provide a *better grip* on oily surfaces. And most Jomacs—like the HR gloves shown above—are reversible . . . so any two make a pair, any pair gives you four working surfaces.

Write today for free literature. Describe working conditions and materials handled: we'll make specific recommendations.

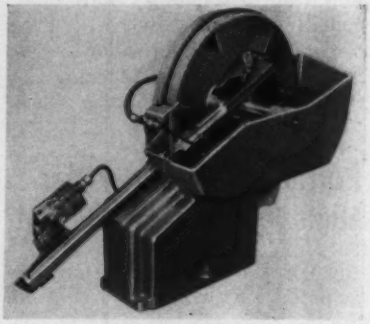
Jomac also makes a complete line of North PVC-coated gloves

JOMAC

INDUSTRIAL GLOVES

JOMAC INC., DEPT. E, PHILADELPHIA 38, PA.

NEW PRODUCTS and equipment



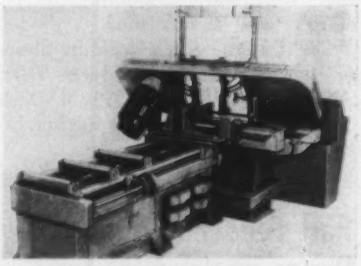
cleats fabricated from spring steel and molded rubber. The unit takes parts up to at least 1½ in. in diameter and lengths up to 3 in. The bowl has a capacity of 700 cu in. Width of the unit is 10½ in. Height is 22 in. Drum diameter is 16 in.

For further information, *write* Dixon Automatic Tool Inc., 2300 23rd Ave., Rockford, Ill.

Power Feed Unit Developed For Metal Cutting Saws

AN AUTOMATIC power feed unit has been developed for the Models W-9, F-14, and J-24 horizontal, metal cutting, bandsaws made by W. F. Wells & Sons. The unit (designated BF-24) is hydraulically controlled and self-contained.

Operation of the power feed unit and saw are integrated by a push-button panel. Manual controls are



used. The operator dials the length of cut, places the work in the vise, and then switches to automatic operation.

The unit is 8 ft long and 3 ft wide with a bed height of 24 in. All moving parts are ball bearing or roller bearing mounted.

For further information, *write* W. F. Wells & Sons, Three Rivers, Mich.

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MANAGEMENT *does* have a stake in good lubrication practices.

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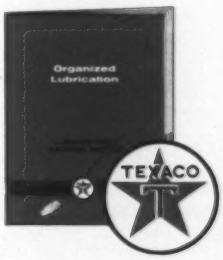
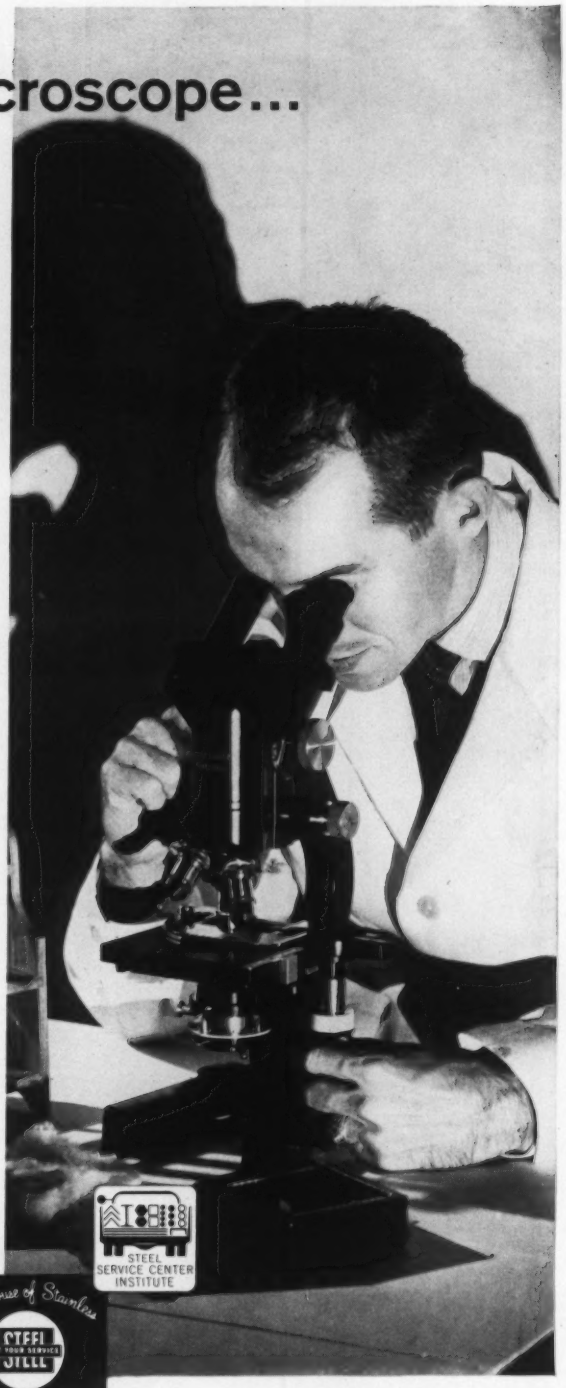


LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

You don't need a microscope...



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NEW literature

Write directly to the company for a copy

Aluminum Joining Manual

A survey of aluminum welding, brazing, and soldering is included in a comprehensive 40 page manual. All-State Welding Alloys Co., White Plains, N. Y.

Aluminum Alloys Guide

A 24 page booklet describes the physical properties, fabrication characteristics, and economic advantages of a wide variety of aluminum sheet, plate, rod, bar, extrusion, and casting alloys. Metals Div., Olin Mathieson Chemical Corp., 400 Park Ave., New York 22, N. Y.

Tension and Torque Control

A 6 page brochure gives specifications, charts, and graphs on tension and torque control units for webs and filaments, automatic edgeguide installations, and electric or pneumatic eye controls. Web Controls Corp., 318 Briarcliffe Rd., West Englewood, N. J.

Air Powered Machines

Catalog No. F-60 gives detailed specifications on a line of drill press feeds, tapping and drilling machines. Beckett-Harcum Co., Wilmington, Ohio.

Stainless Analyses Chart

Data Chart, Sec. A, No. 1, provides analyses specifications for 58 different types of stainless steel, including 40 standard AISI grades. Peter A. Frasse & Co. Inc., 17 Grand St., New York 13, N. Y.

Optical Benches

A 28 page bulletin No. 156-59, describes lathe bed type benches, double rod benches, single rod benches, and accessories. Gaertner Scientific Corp., 1201 Wrightwood Ave., Chicago 14, Ill.

High Temp Alloy Data

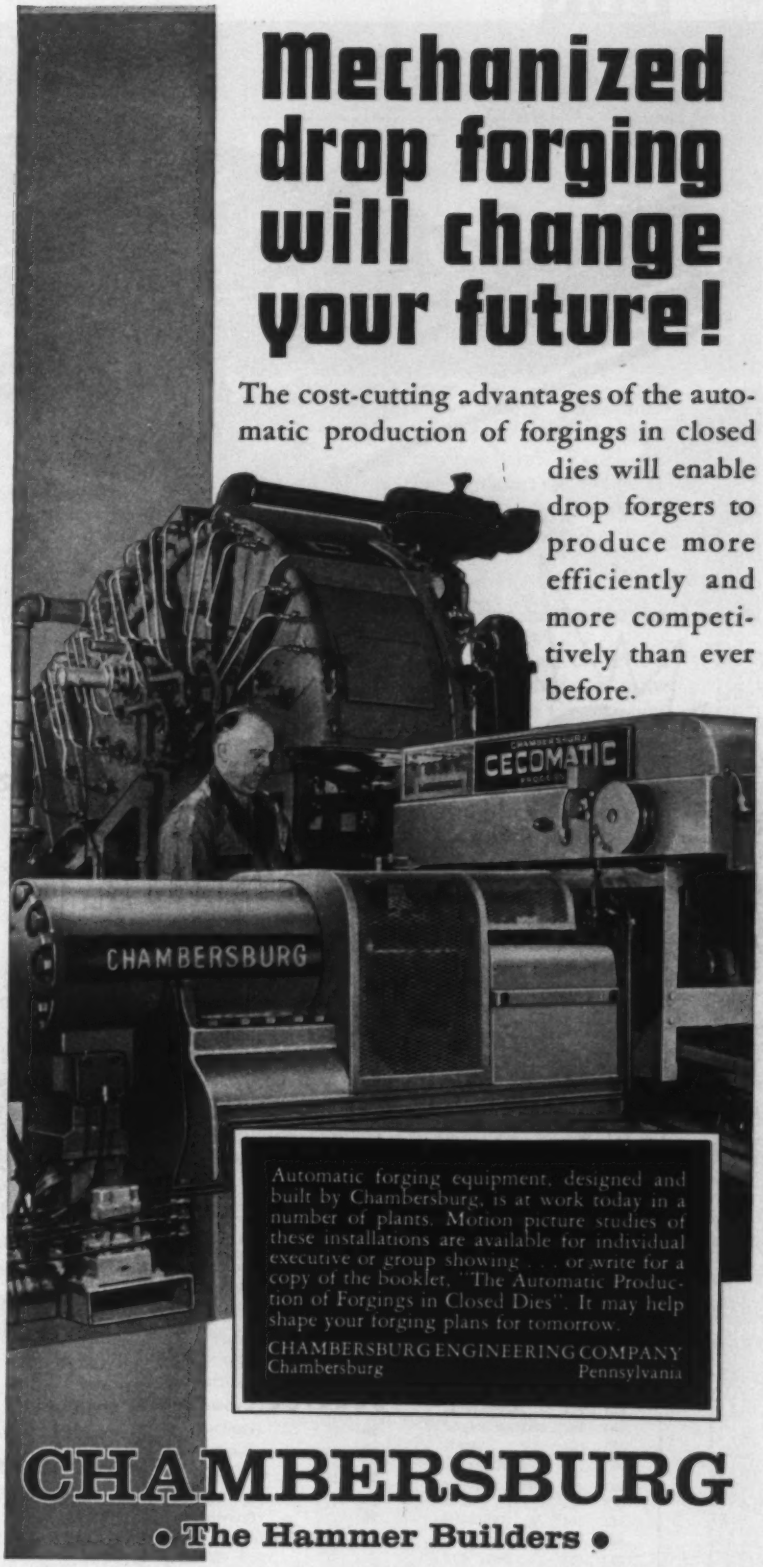
"W-545 Vacuum Melted High Temperature Alloy," 12 pages, gives photomicrographs showing structures of the material and many tables and graphs illustrating the material's properties. Metals Plant, Westinghouse Electric Corp., Blairsville, Pa.

Welding Transformers

A 20 page brochure, SP-23, contains data on resistance welder transformers including: Construction techniques, transformer rating and load demand, magnetizing and load transients, application and duty cycle. Taylor Winfield Corp., Warren, Ohio.

Industrial Socket Screws

An 82 page textbook gives basic information on size, material, and availability (in tabular form); basic design and performance data; and a simplified technology of fasteners. Over 2800 items are covered. Advertising Dept., Standard Pressed Steel Co., Box 579, Jenkintown, Pa.



Mechanized drop forging will change your future!

The cost-cutting advantages of the automatic production of forgings in closed dies will enable drop forgers to produce more efficiently and more competitively than ever before.

Automatic forging equipment, designed and built by Chambersburg, is at work today in a number of plants. Motion picture studies of these installations are available for individual executive or group showing . . . or write for a copy of the booklet, "The Automatic Production of Forgings in Closed Dies". It may help shape your forging plans for tomorrow.

CHAMBERSBURG ENGINEERING COMPANY
Chambersburg Pennsylvania

CHAMBERSBURG
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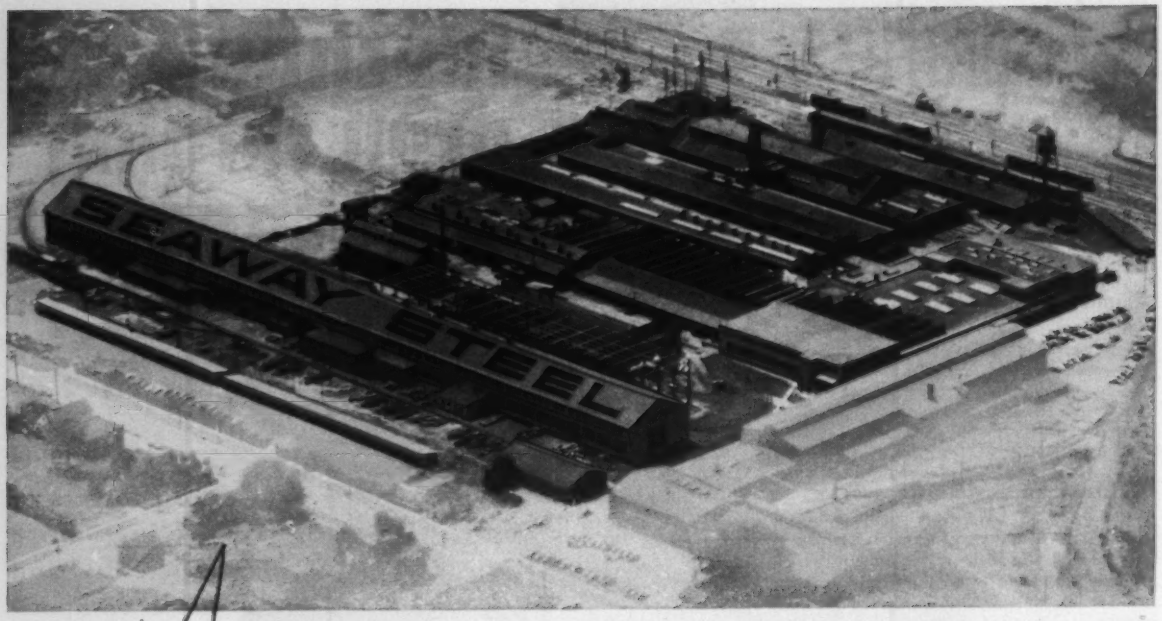

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ON THE STEEL HORIZON

SEAWAY STEEL

At Seaway, every order, large or small receives the *same* special attention. Our operation is "tailor-made" for the customer who requires . . .

FLEXIBILITY... Bars and Rods of any size or shape produced to your specifications, regardless of quantity:

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LUDLOW 9700

SEAWAY STEEL CORPORATION

101 EAST AVENUE • NORTH TONAWANDA, NEW YORK

Users Adjust Inventory Buying

YOU CAN chalk up the continued deflation of steel ingot production to three overriding factors: 1. Automotive cutbacks are leaving big holes in order books. 2. Other consumers have rebuilt their strike depleted inventories and are gearing new orders to current consumption. 3. Shorter lead-times are encouraging buyers to push much of the stockpiling function back to the mills.

AUTOMAKERS CUT OUTPUT— Because their distribution channels are jammed with 1 million unsold cars, automakers are curtailing production and diluting their steel commitments. They'll build about 590,000 cars this month (vs. 654,000 in March) and 1.7 million this quarter (vs. 2 million in the first three months of the year). Also significant to steelmakers: Compact cars will account for about 31 per cent of the auto industry's production during the April-June quarter (vs. 23.7 per cent in the first quarter). On the average, they require only two-thirds of the steel that's needed to make a standard Ford, Chevrolet, or Plymouth.

MILLS FEEL IMPACT— The case may not be typical, but one medium size mill estimates that its April shipments of flat rolled steel to car companies will be 40 per cent less than last month's. Worse yet, May shipments will probably be 40 to 50 per cent under April's. To the dismay of another steelmaker, auto frame manufacturers have cut their orders severely. Reason: One of the Big Three automakers has unloaded some conversion steel on its suppliers. They must use it before placing new orders with the mills.

INVENTORIES REBUILT— Six weeks ago, steel producers would have had no trouble selling canceled or deferred automotive tonnage to other users. Not so today. Since the first of the year, consumers have upped their finished steel inventories from 13.5 million tons to 18.5 million (see Page 64). At the current level, they're in the so-called "normal band" (18 million to 21 million). That's what steelmakers call reasonable—a supply equivalent to about 90 days' consumption. From all indications, users intend to keep their stocks in the reasonable range. They have good reasons for doing so: 1. Leadtimes are short. 2. Steelmakers have great flexibility and ample capacity for every product. 3. There is no danger of a strike and little likelihood of higher prices before December. 4. Costs of possession are high. Dollars tied up in inventory could almost certainly be invested more profitably.

ENOUGH IS ENOUGH— Leading consumers interviewed by STEEL confirm the opinion that stocks will stay in the "normal band." Truck and appliance makers say their inventories are excellent; they'll try to cut down a little during the quarter in anticipation of vacation shutdowns in August and September.

CANADA SPURS PIPELINES— Badly in need of new business, line pipe producers are hailing the Canadian government's approval of several projects calling for the export of natural gas to the U. S. Midwestern Gas Transmission Co. can now begin construction of a 504 mile, 24 in. line from the Canadian border at Emerson, Man., to Marshfield, Wis. That line and others will have an aggregate cost of $443 million.

PRODUCTION SLIDES— Adjusting their output to reduced demand, steelmakers operated fewer furnaces last week and produced about 2,527,000 ingot tons. The operating rate fell from 88.7 to 85.9 per cent of capacity. Look for production to drop again this week but not so sharply.

WHERE TO FIND MARKETS & PRICES

	News	Prices
Bars, Merchant	129	134
Reinforcing	145	135
Boiler Tubes	...	139
Canada	...	...*
Charts:		
Finished Steel	133	...
Ingot Rate	132	...
Scrap Prices	144	...
Clad Steel	...	140
Coal Chemicals	...	142
Coke	128	142
Comparisons	...	133
Contracts Placed	151	...
Contracts Pend.	151	...
Electrodes	...	142
Fasteners	131	139
Ferroalloys	126	143
Fluorspar	...	142
Footnotes	...	139
Imported Steel	132	142
Ingot Rates	132	...
Metal Powder	...	142
Nonferrous Met.	148	150

	News	Prices
Ores	129	142
Pig Iron	128	141
Piling	...	134
Plates	130	134
Plating Material	...	151
Prestressed Strand	...	139
Price Indexes	...	133
Producers' Key	135	...
R.R. Materials	...	139
Refractories	...	142
Scrap	144	146
Semifinished	131	134
Service Centers	132	141
Sheets	126	135
Silicon Steel	...	136
Stainless Steel	...	140
Strip	126	136
Structurals	145	134
Tin Mill Prod.	126	136
Tool Steel	131	140
Tubular Goods	130	140
Wire	130	136

*Current prices were published in the Apr. 4 issue and will appear in subsequent issues.

Autodom Again No. 1 Steel Customer

THE auto industry was the biggest customer of the steel companies in 1959 (regaining a position it has not held since 1955). Steel service centers and distributors were the second largest customer.

This is a reversal of 1958 positions, where service centers were first and autos were second.

In 1959, the automotive industry took 20.48 per cent of mill shipments of finished steel of all grades, while service centers got 18.81 per cent, the American Iron & Steel Institute shows in its annual summary. In 1958, service centers received 18.20 per cent, and autos 16.90.

With both of the top customers taking larger percentages of mill output and with total output larger in 1959 than in 1958, increases in the shipments going to each were sizable. The auto industry received 14,213,875 net tons (an increase of 4,088,841 over 1958), and steel service centers got 13,048,754 (an increase of 2,146,471).

Three other market classifications were big gainers in 1959: Machinery, industrial equipment, and tools; rail transportation; and unclassified.

At the same time, five market groups took less tonnage in 1959 than in 1958. They are: Export, containers, construction and maintenance, shipbuilding and marine equipment, and ordnance and other military.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*

Distribution of Finished Steel in 1959 by Market Classification

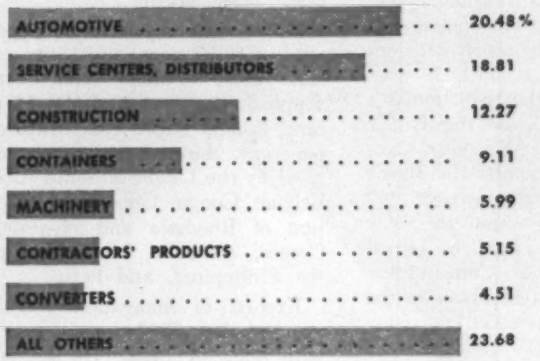
Net tons of mill shipments of all grades, including carbon, alloy, stainless, and heat resisting steel

Market Classification	Ingots, Blooms, Billets, Slabs, Sheet Bars, & Seamless Tube Rounds	Skelp	Wire Rods	Structural Shapes (heavy)	Steel Piling	Plates	Standard Rails (over 60 lb)	Rails (all other)	Joint Bars	Tie Plates
Converters, Processors	358,626	26,658	248,526	406	.....	119,939	733	.....	208	16
Forgings (except automotive)	561,108	.....	146	.....	.....	11,594	.....	.....	.....	.....
Bolts, Nuts, Rivets, Screws	12,565	.....	289,889	.....	.....	13,588	.....	.....	.....	.....
Service Centers, Distributors	32,082	.....	110,825	839,450	43,371	880,384	7,334	10,505	1,038	339
Construction, Maintenance	138,161	.....	29,239	2,080,141	269,561	1,431,578	30,111	12,236	1,864	2,916
Contractors' Products	4,654	382	36,317	19,984	.....	168,917	.....	.....	.....	.....
Automotive	459,861	.....	61,839	52,892	.....	341,755	.....	.....	.....	.....
Rail Transportation	21,626	.....	21	312,195	429	543,177	495,738	6,170	25,280	126,274
Shipbuilding, Marine Equip.	4,449	.....	3	96,777	1,730	464,781	39	338	.....	.....
Aircraft	16,790	.....	106	2,246	.....	5,399	.....	.....	.....	.....
Oil & Gas Drilling	21,815	.....	843	24,864	.....	23,154	.....	.....	.....	.....
Mining, Quarrying, Lumbering	822	.....	37	29,023	432	54,461	6,732	6,733	569	887
Agricultural	20,680	.....	9,963	51,316	.....	116,111	.....	.....	.....	.....
Machinery, Indust. Equip., Tools	137,468	.....	143,727	233,170	.....	1,094,598	830	3,644	81	22
Electrical Machinery & Equip.	8,858	.....	19,105	19,949	.....	140,561	.....	.....	.....	.....
Appliances, Utensils, Cutlery	29	.....	762	670	.....	11,848	.....	.....	.....	.....
Other Domestic, Commercial Equip.	287	.....	21,155	3,065	.....	20,258	.....	.....	.....	.....
Containers	1,200	.....	1,131	173	.....	22,238	.....	.....	.....	.....
Ordnance & Other Military	36,851	.....	74	3,571	16	29,439	.....	6	.....	.....
Export	1,905	14,169	3,833	174,087	25,130	74,826	48,482	2,182	2,154	12,803
Unclassified	8,370	.....	725	146,556	.....	250,550	.....	244	180	5
Totals	1,848,207	41,209	980,266	4,090,535	340,669	5,819,156	590,039	42,058	31,374	143,262

Market Classification	Mechanical Tubing	Pressure Tubing	Wire, Drawn	Nails & Staples	Wire, Barbed & Twisted	Woven Wire Fence	Bale Ties & Baling Wire	Black Plate	Tin & Terne Plate (hot-dipped)	Tin & Terne Plate (electrolytic)
Converters, Processors	11,360	1,087	969,376	2,256	454	169	10	7,918	68	606
Forgings (except automotive)	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
Bolts, Nuts, Rivets, Screws	1	91	255,198	.....	.....	.....	.....	.....	.....	.....
Service Centers, Distributors	121,590	69,016	253,514	357,566	46,771	138,232	53,054	72,968	13,182	92,006
Construction, Maintenance	5,772	6,103	63,292	6,543	477	1,700	73	2,621	235	1,472
Contractors' Products	35,811	2,814	74,137	975	.....	2	.....	24,091	1,076	4,269
Automotive	170,163	13,233	216,232	260	.....	.....	.....	10,146	4,405	24,031
Rail Transportation	990	136	2,814	2,408	676	1,167	.....	323	14	424
Shipbuilding, Marine Equip.	451	361	1,670	31	.....	.....	.....	.....	15	24
Aircraft	2,465	127	1,766	7	.....	.....	.....	.....	.....	61
Oil & Gas Drilling	20,658	1,657	127	13	.....	.....	.....	.....	.....	.....
Mining, Quarrying, Lumbering	2,756	9	1,735	68	8	5	.....	47	.....	.....
Agricultural	29,858	761	11,827	169	44	30	.....	377	18	820
Machinery, Indust. Equip., Tools	227,743	44,522	188,343	3,959	.....	.....	.....	12,075	3,612	14,760
Electrical Machinery & Equip.	9,319	222	39,035	288	.....	.....	.....	1,572	2,220	5,974
Appliances, Utensils, Cutlery	12,205	3,182	56,336	101	.....	.....	.....	38,131	6,688	18,597
Other Domestic, Commercial Equip.	19,406	34	338,385	495	.....	.....	.....	70,060	5,395	18,013
Containers	1,706	12	66,476	6,140	8	.....	2,292	293,340	306,929	4,405,309
Ordnance & Other Military	3,724	274	2,182	46	29	25	1	.....	595	101
Export	7,016	1,330	15,946	773	278	184	13	28,478	67,671	272,044
Unclassified	287,350	115,645	167,206	9,596	.....	.....	99	.....	.....	.....
Totals	970,334	260,616	2,725,598	391,694	48,745	141,514	55,542	562,147	412,123	4,858,511

Tables compiled by STEEL from American Iron & Steel Institute figures.

WHO GOT THE STEEL—1959



Distribution of Alloy and Stainless Steel

(1959 Mill Shipments of Finished Material)

Market Classification	Alloy Other Than Stainless (Net tons)	Stainless and Heat Resisting (Net tons)
Converters, processors	67,832	46,342
Forgings (except automotive)	340,549	8,126
Bolts, nuts, rivets, screws	66,607	6,114
Service centers, distributors	522,599	252,451
Construction, maintenance	100,419	5,837
Contractors' products	15,412	16,614
Automotive	1,303,714	94,917
Rail transportation	176,910	955
Shipbuilding, marine equip.	81,963	1,580
Aircraft	36,325	14,901
Oil and gas drilling	143,886	387
Mining, quarrying, lumbering	20,694	227
Agricultural	26,517	302
Machinery, indust. equip., tools	602,122	43,776
Electrical machinery and equip.	534,151	10,476
Appliances, utensils, cutlery	14,260	44,111
Other domestic, commercial equip.	14,802	13,203
Containers	15,945	1,768
Ordnance & other military	18,581	2,275
Export	113,594	17,666
Unclassified	173,496	32,566
Totals	4,590,378	614,594

Track Spikes	Wheels	Axles	Bars, Hot Rolled (and light shapes)	Bars, Concrete Reinforcing	Bars, Cold Finished	Bars, Tool Steel	Standard Pipe	Oil Country Goods	Line Pipe	Market Classification
161	.....	.....	239,691	3,823	2,480	401	33,560	3,491	1,765	Converters, Processors
.....	.....	.....	381,365	.....	1,613	1,060	.....	.....	.....	Forgings (except automotive)
.....	.....	.....	374,709	.....	40,224	12	.....	.....	.....	Bolts, Nuts, Rivets, Screws
5,359	6	.....	1,134,400	619,943	419,228	14,662	1,580,572	1,780,091	601,238	Service Centers, Distributors
1,356	3,902	1,391	565,007	1,011,031	4,846	416	112,404	15,356	1,558,993	Construction, Maintenance
.....	.....	.....	154,456	41,865	19,525	29	132,495	.....	11,639	Contractors' Products
.....	.....	.....	2,025,598	.....	322,433	901	3,334	.....	457	Automotive
44,277	219,230	92,747	233,123	723	4,942	3	4,679	.....	419	Rail Transportation
.....	38	.....	30,713	113	3,307	1	5,823	.....	8,620	Shipbuilding, Marine Equip.
.....	.....	.....	15,265	.....	8,903	88	33	.....	93	Aircraft
.....	46	.....	123,087	327	10,161	455	6,894	200,495	81,241	Oil & Gas Drilling
367	1,022	916	95,482	1,381	4,029	787	2,063	.....	2,839	Mining, Quarrying, Lumbering
.....	.....	.....	367,285	227	73,288	.....	30,530	.....	419	Agricultural
55	6,900	520	745,369	.....	336,877	18,738	23,924	.....	14,059	Machinery, Indust. Equip., Tools
.....	56	.....	109,096	.....	35,598	38	221,365	.....	1,919	Electrical Machinery & Equip.
.....	.....	.....	14,263	224	32,394	243	6,944	.....	38	Appliances, Utensils, Cutlery
.....	.....	.....	56,820	125	33,401	145	6,282	.....	750	Other Domestic, Commercial Equip.
.....	.....	.....	3,756	.....	1,915	.....	2,772	.....	.....	Containers
1	.....	.....	16,423	.....	6,354	80	187	.....	232	Ordnance & Other Military
813	1,549	1,528	62,704	13,389	4,341	247	18,138	67,228	73,732	Export
.....	.....	.....	187,679	480,291	42,952	57,763	18,525	.....	44,084	Unclassified
52,389	232,749	97,102	6,936,291	2,173,462	1,408,811	96,069	2,210,524	2,066,661	2,802,537	Totals

Sheets, Hot Rolled	Sheets, Cold Rolled	Sheets, Galvanized	Sheets, Coated (all other)	Sheets & Strip, Electrical	Strip, Hot Rolled	Strip, Cold Rolled	Net Totals	Percentage of Totals	Market Classification
607,327	335,097	14,641	1,535	43	98,671	42,305	3,133,407	4.51	Converters, Processors
6	.....	.....	.....	.....	.....	6	956,893	1.38	Forgings (except automotive)
47,536	7,123	625	.....	.....	5,978	23,603	1,071,142	1.54	Bolts, Nuts, Rivets, Screws
1,095,097	1,560,300	841,472	19,282	5,164	133,088	95,625	13,048,754	18.81	Service Centers, Distributors
411,082	114,468	158,006	6,496	.....	57,751	7,578	8,514,178	12.27	Construction, Maintenance
696,499	918,911	1,006,554	16,504	808	75,654	124,828	3,573,196	5.15	Contractors' Products
3,279,200	6,134,849	158,280	163,456	7,128	392,689	370,733	14,213,875	20.48	Automotive
158,071	11,311	27,928	162	5,820	12,651	892	2,356,840	3.40	Rail Transportation
9,005	3,179	5,955	2,757	469	942	296	641,887	0.92	Shipbuilding, Marine Equip.
4,210	4,676	1,039	92	181	4,251	3,545	71,343	0.10	Aircraft
19,902	2,430	803	.....	53	1,512	1	540,538	0.78	Oil & Gas Drilling
12,141	2,387	590	75	63	5,762	697	234,945	0.34	Mining, Quarrying, Lumbering
207,443	75,552	186,641	2,356	24	74,846	4,403	1,264,988	1.82	Agricultural
399,890	256,374	31,588	9,514	6,510	126,614	70,822	4,158,328	5.99	Machinery, Indust. Equip., Tools
194,759	489,380	47,148	12,998	544,177	57,238	90,702	2,051,577	2.96	Electrical Machinery & Equip.
120,336	1,223,686	120,142	21,604	10,973	20,739	109,067	1,829,202	2.67	Appliances, Utensils, Cutlery
121,873	872,437	75,362	6,330	4,927	38,182	119,579	1,832,766	2.64	Other Domestic, Commercial Equip.
374,619	518,018	47,274	1,685	16	148,846	112,374	6,318,229	9.11	Containers
14,503	8,383	460	49	17	1,277	2,534	127,434	0.18	Ordnance & Other Military
67,850	212,511	48,327	15,441	45,578	14,693	7,104	1,408,477	2.03	Export
3,176	.....	.....	.....	359	1,307	206,406	2,029,068	2.92	Unclassified
7,844,519	12,751,072	2,772,835	280,336	632,310	1,272,691	1,393,100	69,377,067	100.00	Totals

Sheets, Strip . . .

Sheet & Strip Prices, Pages 135 & 136

First quarter cancellations and deferments were greater than expected, sheetmakers are now saying. Requests for delayed deliveries are still coming in, but at a slower rate. Sales executives hope that inventory adjustments have been completed and that customers will soon resume buying as much steel as they are consuming.

Although Pittsburgh District mills are operating close to capacity on cold rolled sheets, they haven't much business in view for May and June. It's possible that May eventually will be booked up solidly, but customers are in no hurry to place orders. Mills are setting aside May tonnage for some automotive accounts on the assumption that tentative commitments will be firmed up.

Automakers bought 40 per cent less steel for April than for March, one sheetmaker reports. Although May orders haven't been fully specified, it appears that they'll be 40 to 50 per cent smaller than April's.

Sellers can still book some hot rolled tonnage for delivery in late April and early May, and they have plenty of cold rolled sheets for shipment by mid-May. Enameling stock requirements are off considerably, with some producers offering late April shipment. Also, pressure for electrical sheets has lessened due particularly to a falling off in demand for household appliances. Electrical sheets can be had in about four weeks.

Galvanized sheet order books are well filled through the second quarter, but there are some openings in June schedules. In the Midwest, demand for galvanized is holding up well, and producers are anticipating a pickup in ordering for air conditioning ductwork, construction, and farm requirements. Demand for cold rolled sheets is stronger than that for hot rolled in the area.

Tin Plate . . .

Tin Plate Prices, Page 136

Demand prospects are good in the tin plate market over the next several months, but fourth quarter will probably be the dullest period of the year. By then, food pack requirements will have been accommodated.

Because of large holdover stocks of canned peas, the acreage of that crop in Wisconsin will be held down. Several plants will not operate at all this year, and some will not handle peas.

But even with the reduction, it's said the state will be the No. 1 pea producer. The Wisconsin Canners' Association reports the state's over-all canning crop acreage will remain about the same in 1960. What is lost to peas will be gained in corn and beans. Consumption of tin plate should be about in the same volume as in 1959.

Ferroalloys . . .

Ferroalloy Prices, Page 143

Domestic mine shipments of manganese ore in 1959 totaled 225,000 short tons, reports the U. S. Bureau of Mines. That compares with 323,108 tons in 1958, 366,334 in 1957, 344,735 in 1956, and 287,255 in 1955. Shipments in December, 1959, increased 29 per cent over the November movement, rising to 5300 tons.

Ore imports last year amounted to 2,078,205 short tons vs, 2,452,578 in 1958, 3,105,172 in 1957, 2,238,568 in 1956, and 2,078,205 in 1955. Of the total, 1,031,568 tons came from Brazil.

December manganese ore imports were 238,707 tons, up 5 per cent from the November total. Brazil supplied 51 per cent, India 13 per cent, Ghana 8 per cent, Mexico 6 per cent; the remainder was supplied by the Union of South Africa, Belgian Congo, Cuba, the Federation of Rhodesia and Nyasaland, Greece, Australia, Morocco, Chile, the Philippines, and Peru.

Exports of manganese ore last year totaled 5702 tons compared with 4882 in 1958. At the same time, ferromanganese exports were 4410 tons vs. 3986. Imports of ferromanganese in 1959 totaled 204,672 tons vs. 170,712 in 1958, 411,446 in 1957, 488,436 in 1956, and 242,658 in 1955.

Commenting on imports of manganese ore, the American Manganese Producers Association reports the Department of Agriculture is tentatively contracting to exchange surplus farm commodities for manga-

Steel Shipments by Market Classifications—January, 1960

(Net tons)

Markets:	January, 1960	January, 1959
Converting & processing	406,292	254,702
Forgings (other than auto)	116,697	84,855
Bolts, nuts, rivets, screws	145,641	98,273
Warehouses:		
Oil & gas industry	176,964	147,996
All other	1,425,517	922,527
Total warehouse	1,602,481	1,070,523
Construction:		
Rail transportation	7,925	4,720
Oil & gas	218,503	197,995
All other	774,041	540,999
Total construction	1,000,469	743,714
Contractors' products	422,465	323,078
Automotive:		
Passenger cars, trucks, parts	1,816,841	1,420,333
Forgings	61,841	38,404
Total automotive	1,878,682	1,458,737
Rail transportation:		
Rails, trackwork, equipment	109,556	66,927
Cars & locomotives	228,998	102,005
Transit systems	3,019	2,179
Total railroad	341,573	171,111
Shipbuilding	77,255	68,256
Aircraft	9,081	4,624
Oil & gas drilling	63,368	48,943
Mining, quarrying, lumbering	34,572	16,864
Agricultural:		
Machinery	110,548	106,689
All other	31,556	22,104
Total agricultural	142,104	128,793
Machinery, tools, equipment	501,119	381,911
Elec. machinery, equipment	242,581	190,160
Appliances, utensils, cutlery	207,801	185,122
Other domestic & commercial equipt.	202,969	181,982
Containers:		
Cans and closures	505,874	418,230
Barrels, drums, pails	99,014	73,824
All other	66,752	50,398
Total containers	671,640	542,452
Ordnance and other military	13,740	13,068
Nonclassified shipments	200,080	65,312
Total domestic shipments	8,280,610	6,032,480
Exports	149,086	153,688
Total shipments	8,429,696	6,186,168

Data from American Iron & Steel Institute.

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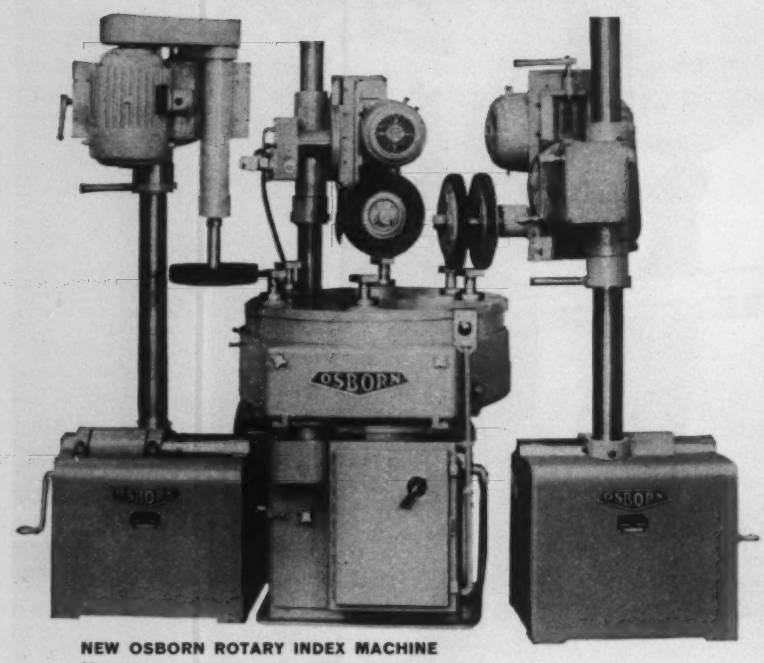

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nese from India. Manganese producers are urging that manganese be removed from government's recently revised barter list of commodities to be considered for trade of surplus farm products.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 142

Production of coke in February totaled 6,029,620 net tons (5,911,533 oven, and 118,087 beehive) reports the U. S. Bureau of Mines. In January, 6,296,682 tons (6,186,585 oven, and 110,097 beehive) were produced. Output in February, 1959, was 5,528,347 tons (5,436,617 oven, and 91,730 beehive).

Stocks of oven coke held by producers at the end of February were 3,656,033 tons, equal to 17.9 days' production. That compares with 3,709,108 tons, 19.1 days' production, at the end of February a year ago.

Pig Iron . . .

Pig Iron Prices, Page 141

Blast furnace operations are tapering, in part reflecting sluggish demand for pig iron, both in the merchant trade and for steelmaking. Sharon Steel Corp. has blown out one of its two Roemer Works stacks, reducing the number of blast furnaces in operation in the Youngstown District to 17.

In the Chicago District, U. S. Steel closed down two of 11 blast furnaces at its South Works.

Youngstown Sheet & Tube Co. recently relighted its No. 1 blast furnace at Indiana Harbor, to give full operation of its three stacks there. The furnace had been idle since Jan. 25 for relining. However, two of three stacks at the company's South Chicago plant have been banked.

Active blast furnaces in the Chicago District now total 36, the lowest number in operation since the first week of December (also 36) following the steel strike.

There has been some curtailment of steelmaking operations at Buffalo, but 15 out of 16 blast furnaces in that area are still producing. A further decline in open hearth operations may result in a cutback in active blast furnaces.

Demand for merchant pig iron is showing little change from the sluggish pace of recent weeks. Buy-

ing is largely on a short term basis.

Foreign foundry iron is entering the country in substantial tonnage. It is principally from Germany, Holland, South Africa, and Spain. With consumers' requirements light, the imports are cutting into domestic sales.

Most job foundries in the East are having difficulty maintaining operations on a four day week. However, one pressure pipe foundry has its operations up to five days weekly, which is exceptional since cast pipe firms report spotty demand.

Prices on Mystic iron still held in stock at Everett, Mass., will hold unchanged through the second quarter at $68 for No. 2 foundry. The Mystic furnace closed down last October, but old customers are being advised as to tonnage and analyses available for shipment. It's understood stocks have been shrinking slowly.

Iron Ore Imports in '59 Establish a Record

Imports of foreign iron ore were record breaking in 1959, reports the American Iron & Steel Institute on the basis of U. S. Commerce Department data. The record 39.9 million net tons exceeded the former high of 37.7 million in 1957 by more than 5 per cent. It represents a 28 per cent increase over the 1958 total of 31.2 million.

Major changes took place in the ore import picture during the 1950s. Tonnage brought in increased fourfold. Some major sources in 1959 supplied no tonnage to the U. S. at the start of the decade. Sources that were important in 1950 have curtailed shipments to this country.

In 1950, about 9.2 million net tons came in from abroad—a record for that time. That total was exceeded in each succeeding year.

The top six sources in 1959: Venezuela, 15.2 million tons; Canada, 15 million; Chile, 4 million; Peru, 2.5 million; Brazil, 1.3 million; Liberia, 1.2 million. The top six in 1950: Chile, 2.9 million; Sweden, 2.3 million; Canada, 2.1 million; Brazil, 0.8 million; Algeria, 0.6 million; British W. Africa, 0.2 million.

Major iron ore imports from Venezuela began in 1951 and have risen sharply since. Peruvian iron ore began coming into this country in appreciable tonnage in 1953, and the first ore of the decade from Liberia arrived in 1951. All the sources were developed largely with the aid of American capital and technical knowhow.

Steel Bars . . .

Bar Prices, Page 134

Most hot rolled carbon bar sellers are now talking May delivery. But some can work in a little tonnage for late April shipment. Demand for larger sizes is better than that for the smaller sizes.

"We're suffering from inventory indigestion," says a leading Pittsburgh area producer of cold finished bars. Although current operations are close to capacity, they won't be sustained much longer unless there's a quick reversal of the incoming order trend.

First quarter shipments were excellent, but backlogs have about disappeared. Bookings for May and June are skimpy. Demand from major consumers—auto builders, agricultural machinery makers, fastener manufacturers—is far below expectations. Buyers who were clamoring for delivery two months ago are now asking that April and May tonnage be held back until August. Service centers seem to be the only customers still replenishing their inventories.

To make matters worse, cold finishers are having a hard time getting the hot rolled bars they need the most. Cancellations and deferments have apparently upset hot mill rolling schedules, forcing some March tonnage to be carried over into April. Cold finishers see no prospects for an upturn until the end of May. By that time, it's hoped, surplus stocks will have been used up.

Except for sustained requirements from makers of small arms, steel bar demand is slow in New England. Consumption there is holding up well, but users are operating off inventory and are confining second quarter orders to replacement tonnage.

Springfield (Mass.) Arsenal is closing on 35,600 barrel blanks, and Raritan Arsenal (New Jersey), is

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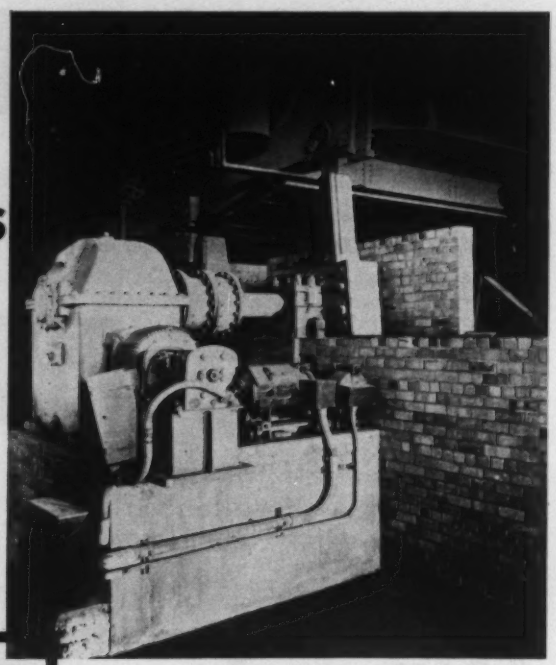
Tilting 700-tons of steel furnace



CONE-DRIVE GEARS

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Tubular Goods . . .

Tubular Goods Prices, Page 140

Some of the current drop in steelmaking operations is attributed to continued sluggish demand for tubular goods. Substantial tonnage orders for line pipe are being held up pending approval of proposed gas transmission lines by the Federal Power Commission.

Seasonal pickup in building requirements for standard pipe is expected to put a little life into the market. Volume orders were held up in March by bad weather.

Oil well drilling held steady during the week ended Mar. 28. Hughes Tool Co.'s survey showed 1679 rotary rigs operating vs. 1683 in the preceding week and 1997 a year ago.

Wire . . .

Wire Prices, Pages 136 & 139

Demand for wire and wire products is slow. The manufacturing grades are available for delivery in three weeks, and merchant wire in two weeks. Substantial import volume is continuing to cut into domestic sales of the merchant items.

First to feel the impact of production cutbacks in the automotive industry, manufacturers' wire is drifting aimlessly. Automakers won't cut their May purchases of wire as much as they'll trim sheet orders, but only because they started cutting back sooner in wire.

Most wire makers are more concerned about customers' big inventories than they are about demands for quick deliveries. The outlook for July is not good, largely because many consumers will be closing their plants for vacations. Right now, furniture manufacturing is the only market that looks promising. Demand for spring wire seems to be riding an uptrend.

Plates . . .

Plate Prices, Page 134

Increasing offerings of strip plate are augmenting current plate supplies. That indicates a softer situation in the light flat rolled products. One strip plate producer is offering substantial quantities for May shipment.

Sheared and universal plates can

readily be had for delivery in late April and early May.

Except for a slight seasonal pick-up in building requirements, plate demand generally continues to lag.

On the West Coast, a Portland, Oreg., firm is offering used plate from a dismantled Navy cruiser at 5 cents a pound. It is 1 in. to 2½ in. thick.

Tool Steel . . .

Tool Steel Prices, Page 140

Introduction of a new steel-cutting grade of hard carbides, specifically developed for high speed and high precision machining, and for finish machining hard alloys, has been announced by Kennametal Inc., Latrobe, Pa. Known as Grade K165, it has a titanium carbide base.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 139

The Pacific Coast Div., Bethlehem Steel Co., has installed new equipment in its Bolt & Nut Dept. at South San Francisco, Calif. The project rounds out its facilities for producing a full range of threaded rods ¼ in. to 2 in. in diameter. A new roller threader is capable of handling rods ¼ in. to ⅝ in. in diameter in any length and up to 4 in. in threaded length. The equipment supplements a machine which covers the ½ to 2 in. range of threading.

Semifinished Steel . . .

Semifinished Prices, Page 134

The sag in steel production is continuing. Last week, the national ingot rate slipped 2.8 points to 85.9 per cent of capacity, lowest since mid-November last year, reports the American Iron & Steel Institute. Output for the week was estimated at 2,457,000 net tons vs. 2,527,000 the preceding week, 2,654,000 a month ago, and 2,641,000 a year ago.

Declines were reported in all producing districts (see table on Page 132). Despite the slackening, operations are high in most districts. At some points they're well over 90 per cent of capacity.

Flood waters hampered production at the Stubenville (Ohio) Works of Wheeling Steel Corp., and the hot strip mill at Farrell, Pa., of Sharon Steel Corp. Wheeling

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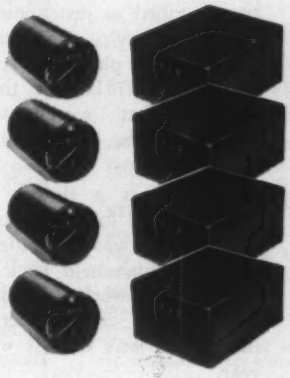

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temporarily closed down two of five blast furnaces and all 11 openhearth furnaces at Steubenville because of the high water. Sharon recently closed its Lowellville, Ohio, Works.

Jones & Laughlin closed a coal loading dock at its Pittsburgh Works on the Monongahela River, and another at its Aliquippa, Pa., works on the Ohio River, but suffered no interruption of steel production.

Sharon Steel idled one blast furnace at its Roemer Works in Farrell, leaving one stack in operation. Sharon has enough cold pig iron, along with scrap, to supply its steel plant's metallic requirements with only one blast furnace operating.

Bethlehem Steel's Lackawanna (N. Y.) plant took two more open hearths out of production. The plant is operating 28 of its 35 open hearths. The seven idle units are being rebuilt. One will be placed back in service shortly.

U. S. Steel has cut back production by 20 per cent at its South Works in Chicago due to lack of business. Ingot production, which has been running at a record 440,000 tons monthly, will be trimmed to 358,000 tons, 76.9 per cent of capacity.

Two of 11 blast furnaces will be closed down, one for two months for repairs, the other until the open hearth units resume operation.

Steel finishing operations at the plant are also being slowed. Sharpest cutback will be in stainless steel.

South Works is one of two major steelmaking units of U. S. Steel in the Chicago area. The corporation has no plans to cut production at its larger Gary Works; operations there are scheduled to continue close to 97 per cent of capacity.

Wisconsin Steel Div., International Harvester Co., has laid off 500 workers the past three weeks and put 2100 in the finishing mills on a four-day week. Steelmaking has been reduced at Youngstown Sheet & Tube's Indiana Harbor plant, but there have been no layoffs or reduced workweeks there.

Steel production at major mills in the Youngstown district has dropped noticeably. The district rate stands at 76 per cent vs. 95 per cent in late February.

Distributors . . .

Prices, Page 141

The steel service centers are rebuilding their inventories with surprising speed. Stocks at many points are described as just about back to normal. They're adequate to meet the seasonal pickup in customers' requirements. It was thought in January that warehouse stocks would not be replenished before midyear.

March was a slower than expected month for some distributors. Sluggishness was attributed to bad weather which held back considerable outside work. In the Southwest, service center operators say the month was slowest so far this year.

With more favorable weather this month, expectations are there will be a sharp rise in demand. However, stiff competition is reported at some points. All of it is not due to foreign offerings. In fact, it was reported in the Midwest last week that second sheets were being offered at sharply reduced prices, with the result warehouses handling prime material were said to be under increasing price pressure from consumers.

Prices on foreign steel are drifting lower and are serving to unsettle the general market, especially in the Gulf Coast area. One distributor there said it was difficult to move items in competition with the foreign steel.

Wider Price Spread On Import Steel Expected

Steel consumers in the Southwest are reportedly well stocked, and reordering at the mill level is declining. At the same time, liquidation of excess foreign steel inventories is progressing slowly. New buying of foreign metal at the mill level continues limited. Eventually, a spread of $20-$25 per ton between foreign and domestic steel products is expected. A year ago, the spread was $40 to $45 a ton.

Rectifiers Are Cut Again

The second major price reduction in two months on low current silicon rectifiers was announced last week by General Electric Co., Syracuse, N. Y. Affected are 39 models which are reduced in price by 4 to 50 per cent. (This is the first reduction on 30 models, the second on nine.)

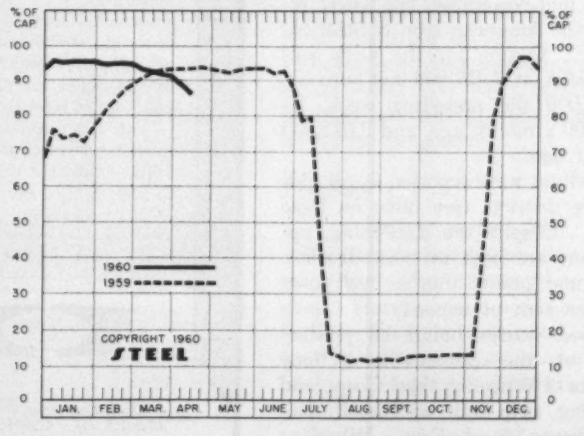
DISTRICT INGOT RATES

(Percentage of capacity utilized)

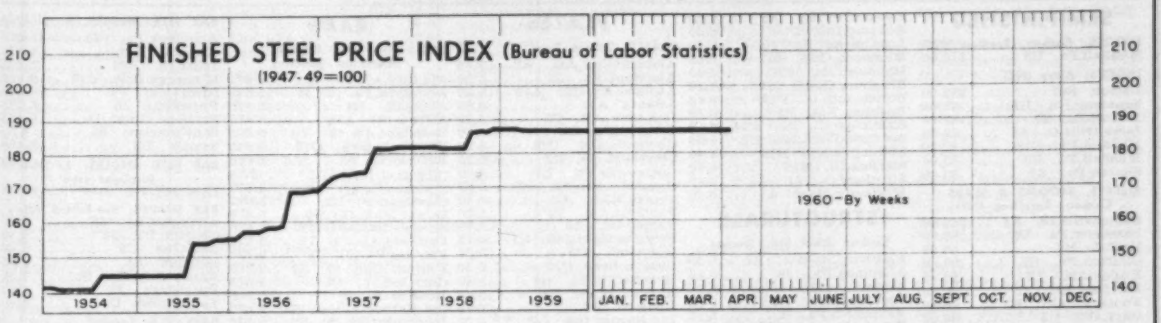
	Week Ended Apr. 10	Week Ago	Month Ago	Year Ago
Northeastern	85	87	87	97
Buffalo	92	98	103	95
Pittsburgh	85	86	97	96
Youngstown	76	79	86	89
Cleveland	95	98	101	97
Detroit	98	103	104	97
Chicago	90	95	98	94
Cincinnati	99	101	101	79
St. Louis	99	101	100	98
Southern	82	84	87	94
Western	71	75	82	95
Total Industry ..	85.9	88.7	93.1	93.3
Index ..... (1947-49=100)	152.3	157.3	165.2	164.4
Net Tons ..... (In thousands)	2,457	2,527	2,654	2,641

Current week's figures are preliminary. Weekly capacity (net tons): 2,849,306 in 1960 and 2,831,331 in 1959. Source: American Iron & Steel Institute.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Apr. 5, 1960	Week Ago	Month Ago	Feb. Index	Year Ago
186.8	186.8	186.8	186.8	186.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Apr. 5

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.765
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.905
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.585
		Pipe, Line (100 ft)	199.533
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200	Black Plate, Canmaking Quality (95 lb base box)	7.900
Tubing, Mechanical, Carbon (100 ft)	27.005	Wire, Drawn, Carbon	10.575
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608	Wire, Drawn, Stainless, 430 (lb)	0.665
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100	Bale Ties (bundles)	7.967
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800	Nails, Wire, 8d Common	9.825
		Wire, Barbed (80-rod spool)	8.766
		Woven Wire Fence (20-rod roll)	21.880

STEEL's FINISHED PRICE INDEX*

	Apr. 6 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	194.53
Index in cents per lb	6.713	6.713	6.713	6.713	5.270

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$118.40
No. 2 Fdry, Pig Iron, GT.	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	33.66	33.66	34.33	36.17	37.41

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Apr. 6 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	5.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods, 1/2-5/8" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton

	Apr. 6 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	55.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	60.58
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$34.50	$34.50	$35.50	$36.50	$38.50
No. 1 Heavy Melt, E. Pa.	35.00	35.00	36.00	34.50	37.75
No. 1 Heavy Melt, Chicago	31.50	31.50	33.50	37.50	36.00
No. 1 Heavy Melt, Valley	36.50	36.50	37.50	40.50	37.50
No. 1 Heavy Melt, Cleve.	33.50	33.50	34.50	36.50	35.00
No. 1 Heavy Melt, Buffalo	30.50	31.50	31.50	34.50	32.50
Rails, Rerolling, Chicago	53.50	53.50	57.50	59.50	52.50
No. 1 Cast, Chicago	45.50	45.50	46.50	47.50	41.50

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$13.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	25.25

Steel Prices

Mill prices as reported to STEEL, Apr. 6, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 135; footnotes, page 139.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ..... $76.00

INGOTS, Alloy (NT)
Detroit S41 ..... $82.00
Economy,Pa. B14 ..... 82.00
Farrell,Pa. S3 ..... 82.00
Lowellville,O. S3 ..... 82.00
Midland,Pa. C18 ..... 82.00
Munhall,Pa. U5 ..... 82.00
Sharon,Pa. S3 ..... 82.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)
Bartonville,Ill. K4 ..... $82.00
Bessemer,Pa. U5 ..... 80.00
Buffalo R2 ..... 80.00
Clairton,Pa. U5 ..... 80.00
Ensley,Ala. T2 ..... 80.00
Fairfield,Ala. T2 ..... 80.00
Fontana,Calif. K1 ..... 90.50
Gary,Ind. U5 ..... 80.00
Johnstown,Pa. B2 ..... 80.00
Lackawanna,N.Y. B2 ..... 80.00
Munhall,Pa. U5 ..... 80.00
Owensboro,Ky. G8 ..... 80.00
S.Chicago,Ill. R2, U5 ..... 80.00
S.Duquesne,Pa. U5 ..... 80.00
Sterling,Ill. N15 ..... 80.00
Youngstown R2 ..... 80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ..... $99.50
Buffalo R2 ..... 99.50
Canton,O. R2 ..... 102.00
Clairton,Pa. U5 ..... 99.50
Conshohocken,Pa. A3 ..... 104.50
Ensley,Ala. T2 ..... 99.50
Fairfield,Ala. T2 ..... 99.50
Farrell,Pa. S3 ..... 99.50
Fontana,Calif. K1 ..... 109.00
Gary,Ind. U5 ..... 99.50
Geneva,Utah C11 ..... 99.50
Houston S5 ..... 104.50
Johnstown,Pa. B2 ..... 99.50
Lackawanna,N.Y. B2 ..... 99.50
LosAngeles B3 ..... 109.00
Midland,Pa. C18 ..... 99.50
Munhall,Pa. U5 ..... 99.50
Owensboro,Ky. G8 ..... 99.50
Seattle B3 ..... 109.00
Sharon,Pa. S3 ..... 99.50
S.Chicago R2, U5, W14 99.50
S.Duquesne,Pa. U5 ..... 99.50
S.SanFrancisco B3 ..... 109.00
Warren,O. C17 ..... 99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..... $119.00
Bridgeport,Conn. C32 ..... 119.00
Buffalo R2 ..... 119.00
Canton,O. R2, T7 ..... 119.00
Conshohocken,Pa. A3 ..... 126.00
Detroit S41 ..... 119.00
Economy,Pa. B14 ..... 119.00
Farrell,Pa. S3 ..... 119.00
Fontana,Calif. K1 ..... 140.00
Gary,Ind. U5 ..... 119.00
Houston S5 ..... 124.00
Ind.Harbor,Ind. Y1 ..... 119.00
Johnstown,Pa. B2 ..... 119.00
Lackawanna,N.Y. B2 ..... 119.00
LosAngeles B3 ..... 139.00
Lowellville,O. S3 ..... 119.00
Massillon,O. R2 ..... 119.00
Midland,Pa. C18 ..... 119.00
Munhall,Pa. U5 ..... 119.00
Owensboro,Ky. G8 ..... 119.00
Sharon,Pa. S3 ..... 119.00
S.Chicago R2,U5,W14 119.00
S.Duquesne,Pa. U5 ..... 119.00
Struthers,O. Y1 ..... 119.00
Warren,O. C17 ..... 119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ..... $122.50
Canton,O. R2 ..... 125.00
Cleveland R2 ..... 122.50
Gary,Ind. U5 ..... 122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ..... 122.50
Warren,O. C17 ..... 122.50

SKELP
Aliquippa,Pa. J5 ..... 5.05
Ind.Harbor,Ind. Y1 ..... 5.05
Munhall,Pa. U5 ..... 5.05
Pittsburgh J5 ..... 5.05
Warren,O. R2 ..... 5.05
Youngstown R2, U5 ..... 5.05

WIRE RODS
AlabamaCity,Ala. R2 ..... 6.40
Aliquippa,Pa. J5 ..... 6.40
Alton,Ill. L1 ..... 6.60
Bartonville,Ill. K4 ..... 6.50
Buffalo W12 ..... 6.40
Cleveland A7 ..... 6.40
Donora,Pa. A7 ..... 6.40
Fairfield,Ala. T2 ..... 6.40
Houston S5 ..... 6.65
IndianaHarbor,Ind. Y1 ..... 6.40
Johnstown,Pa. B2 ..... 6.40
Joliet,Ill. A7 ..... 6.40
KansasCity,Mo. S5 ..... 6.65
Kokomo,Ind. C16 ..... 6.50
LosAngeles B3 ..... 7.20
Minnequa,Colo. C10 ..... 6.65
Monessen,Pa. P7 ..... 6.40
Pittsburg,Calif. C11 ..... 7.20
Portsmouth,O. P12 ..... 6.40
Roebling,N.J. R5 ..... 6.50
S.Chicago,Ill. R2, W14 ..... 6.40
SparrowsPoint,Md. B2 ..... 6.50
Sterling,Ill.(1) N15 ..... 6.40
Sterling,Ill. N15 ..... 6.50
Struthers,O. Y1 ..... 6.40
Worcester,Mass. A7 ..... 6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..... 5.50
Aliquippa,Pa. J5 ..... 5.50
Atlanta A11 ..... 5.70
Bessemer,Ala. T2 ..... 5.50
Bethlehem,Pa. B2 ..... 5.55
Birmingham C15 ..... 5.50
Clairton,Pa. U5 ..... 5.50
Fairfield,Ala. T2 ..... 5.50
Fontana,Calif. K1 ..... 6.30
Gary,Ind. U5 ..... 5.50
Geneva,Utah C11 ..... 5.50
Houston S5 ..... 5.60
Ind.Harbor,Ind. I-2, Y1 ..... 5.50
Johnstown,Pa. B2 ..... 5.55
Joliet,Ill. P22 ..... 5.50
KansasCity,Mo. S5 ..... 5.60
Lackawanna,N.Y. B2 ..... 5.55
Los Angeles B3 ..... 6.20
Minnequa,Colo. C10 ..... 5.80
Munhall,Pa. U5 ..... 5.50
Niles,Calif. P1 ..... 6.25
Phoenixville,Pa. P4 ..... 5.55
Portland,Oreg. O4 ..... 6.25
Seattle B3 ..... 6.25
S.Chicago,Ill. U5, W14 ..... 5.50
S.SanFrancisco B3 ..... 6.15
Sterling,Ill. N15 ..... 5.50
Torrance,Calif. C11 ..... 6.20
Weirton,W.Va. W6 ..... 5.50

Wide Flange
Bethlehem,Pa. B2 ..... 5.55
Clairton,Pa. U5 ..... 5.50
Fontana,Calif. K1 ..... 6.45
IndianaHarbor,Ind. I-2 ..... 5.50
Lackawanna,N.Y. B2 ..... 5.55
Munhall,Pa. U5 ..... 5.50
Phoenixville,Pa. P4 ..... 5.55
S.Chicago,Ill. U5 ..... 5.50
Sterling,Ill. N15 ..... 5.50
Weirton,W.Va. W6 ..... 5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 6.90
Munhall,Pa. U5 ..... 6.80
S.Chicago,Ill. U5, W14 ..... 6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ..... 8.05
Bessemer,Ala. T2 ..... 8.05
Bethlehem,Pa. B2 ..... 8.10
Clairton,Pa. U5 ..... 8.05
Fairfield,Ala. T2 ..... 8.05
Fontana,Calif. K1 ..... 8.85
Gary,Ind. U5 ..... 8.05
Geneva,Utah C11 ..... 8.05
Houston S5 ..... 8.15
Ind.Harbor,Ind. I-2, Y1 ..... 8.05
Johnstown,Pa. B2 ..... 8.10
KansasCity,Mo. S5 ..... 8.15
Lackawanna,N.Y. B2 ..... 8.10
LosAngeles B3 ..... 8.75
Munhall,Pa. U5 ..... 8.05
Seattle B3 ..... 8.80
S.Chicago,Ill. U5, W14 ..... 8.05
S.SanFrancisco B3 ..... 8.70
Sterling,Ill. N15 ..... 7.75
Struthers,O. Y1 ..... 8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ..... 8.10
Ind.Harbor,Ind. I-2 ..... 8.05
Lackawanna,N.Y. B2 ..... 8.10
Munhall,Pa. U5 ..... 8.05
S.Chicago,Ill. U5 ..... 8.05
Sterling,Ill. N15 ..... 7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ..... 5.55
Ind.Harbor,Ind. I-2 ..... 5.50
Lackawanna,N.Y. B2 ..... 5.55
Munhall,Pa. U5 ..... 5.50
S.Chicago,Ill. I-2, U5 ..... 5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ..... 6.50
Lackawanna,N.Y. B2 ..... 6.50
Munhall,Pa. U5 ..... 6.50
S.Chicago,Ill. I-2, U5 ..... 6.50
Weirton,W.Va. W6 ..... 6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..... 5.30
Aliquippa,Pa. J5 ..... 5.30
Ashland,Ky.(15) A10 ..... 5.30
Atlanta A11 ..... 5.50
Bessemer,Ala. T2 ..... 5.30
Clairton,Pa. U5 ..... 5.30
Claymont,Del. C22 ..... 5.30
Cleveland J5, R2 ..... 5.30
Coatesville,Pa. L7 ..... 5.30
Conshohocken,Pa. A3 ..... 5.30
Ecorse,Mich. G5 ..... 5.30
Fairfield,Ala. T2 ..... 5.30
Farrell,Pa. S3 ..... 5.30
Fontana,Calif.(30) K1 ..... 6.10
Gary,Ind. U5 ..... 5.30
Geneva,Utah C11 ..... 5.30
GraniteCity,Ill. G4 ..... 5.40
Harrisburg,Pa. P4 ..... 5.30
Houston S5 ..... 5.40
Ind.Harbor,Ind. I-2, Y1 ..... 5.30
Johnstown,Pa. B2 ..... 5.30
Lackawanna,N.Y. B2 ..... 5.30
Mansfield,O. E6 ..... 5.30
Minnequa,Colo. C10 ..... 6.15
Munhall,Pa. U5 ..... 5.30
Newport,Ky. A2 ..... 5.30
Pittsburgh J5 ..... 5.30
Riverdale,Ill. A1 ..... 5.30
Seattle B3 ..... 6.20
Sharon,Pa. S3 ..... 5.30
S.Chicago,Ill. U5, W14 ..... 5.30
SparrowsPoint,Md. B2 ..... 5.30
Sterling,Ill. N15 ..... 5.30
Steubenville,O. W10 ..... 5.30
Warren,O. R2 ..... 5.30
Youngstown U5, Y1 ..... 5.30
Youngstown(27) R2 ..... 5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ..... 7.05
Fontana,Calif. K1 ..... 7.85
Geneva,Utah C11 ..... 7.05
Houston S5 ..... 7.15
Johnstown,Pa. B2 ..... 7.05
SparrowsPoint,Md. B2 ..... 7.05

PLATES, Wrought Iron
Economy,Pa. B14 ..... 14.10

PLATES, H.S. L.A.
Aliquippa,Pa. J5 ..... 7.95
Ashland,Ky. A10 ..... 7.95
Bessemer,Ala. T2 ..... 7.95
Clairton,Pa. U5 ..... 7.95
Claymont,Del. C22 ..... 7.95
Cleveland J5, R2 ..... 7.95
Coatesville,Pa. L7 ..... 7.95
Conshohocken,Pa. A3 ..... 7.95
Economy,Pa. B14 ..... 7.95
Ecorse,Mich. G5 ..... 7.95
Fairfield,Ala. T2 ..... 7.95
Farrell,Pa. S3 ..... 7.95
Fontana,Calif.(30) K1 ..... 8.75
Gary,Ind. U5 ..... 7.95
Geneva,Utah C11 ..... 7.95
Houston S5 ..... 8.05
Ind.Harbor,Ind. I-2, Y1 ..... 7.95
Johnstown,Pa. B2 ..... 7.95
Munhall,Pa. U5 ..... 7.95
Pittsburgh J5 ..... 7.95
Seattle B3 ..... 8.85
Sharon,Pa. S3 ..... 7.95
S.Chicago,Ill. U5, W14 ..... 7.95
SparrowsPoint,Md. B2 ..... 7.95
Warren,O. R2 ..... 7.95
Youngstown U5, Y1 ..... 7.95

PLATES, Alloy
Aliquippa,Pa. J5 ..... 7.50
Claymont,Del. C22 ..... 7.50
Coatesville,Pa. L7 ..... 7.50
Economy,Pa. B14 ..... 7.50
Farrell,Pa. S3 ..... 7.50
Fontana,Calif. K1 ..... 8.30
Gary,Ind. U5 ..... 7.50
Houston S5 ..... 7.60
Ind.Harbor,Ind. Y1 ..... 7.50
Johnstown,Pa. B2 ..... 7.50
Lowellville,O. S3 ..... 7.50
Munhall,Pa. U5 ..... 7.50
Newport,Ky. A2 ..... 7.50
Pittsburgh J5 ..... 7.50
Seattle B3 ..... 8.40
Sharon,Pa. S3 ..... 7.50
S.Chicago,Ill. U5, W14 ..... 7.50
SparrowsPoint,Md. B2 ..... 7.50
Youngstown Y1 ..... 7.50

FLOOR PLATES
Cleveland J5 ..... 6.375
Conshohocken,Pa. A3 ..... 6.375
Ind.Harbor,Ind. I-2 ..... 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
S.Chicago,Ill. U5 ..... 6.375

PLATES, Ingot Iron
Ashland c.l. (15) A10 ..... 5.55
Ashland l.c.l. (15) A10 ..... 6.05
Cleveland c.l. R2 ..... 6.05
Warren,O. R2 ..... 6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..... 5.675
Aliquippa,Pa. (9) J5 ..... 5.675
Alton,Ill. L1 ..... 5.875
Atlanta(9) A11 ..... 5.875
Bessemer,Ala.(9) T2 ..... 5.675
Birmingham(9) C15 ..... 5.675
Buffalo(9) R2 ..... 5.675
Canton,O.(23) R2 ..... 6.15
Clairton,Pa.(9) U5 ..... 5.675
Cleveland(9) R2 ..... 5.675
Ecorse,Mich.(9) G5 ..... 5.675
Emeryville,Calif. J7 ..... 6.425
Fairfield,Ala.(9) T2 ..... 5.675
Fairless,Pa.(9) U5 ..... 5.825
Fontana,Calif.(9) K1 ..... 6.375
Gary,Ind.(9) U5 ..... 5.675
Houston(9) S5 ..... 5.925
Ind.Harbor(9) I-2, Y1 ..... 5.675
Johnstown,Pa.(9) B2 ..... 5.675
Joliet,Ill. P2 ..... 5.675
KansasCity,Mo.(9) S5 ..... 5.925
Lackawanna(9) B2 ..... 5.675
LosAngeles(9) B3 ..... 6.375
Massillon,O.(23) R2 ..... 6.15
Midland,Pa.(23) C18 ..... 6.025
Milton,Pa. M18 ..... 5.825
Minnequa,Colo. C10 ..... 6.125
Niles,Calif. P1 ..... 6.375
Owensboro,Ky.(9) G8 ..... 6.025
Pittsburg,Calif.(9) C11 ..... 6.375
Pittsburgh(9) J5 ..... 5.675
Portland,Oreg. O4 ..... 6.425
Riverdale,Ill.(9) A1 ..... 5.675
Seattle A24, B3, N15 ..... 6.425
S.Ch'c'go(9) R2, U5, W14 ..... 5.675
S.Duquesne,Pa.(9) U5 ..... 5.675
S.SanFran.,Calif.(9) B3 ..... 6.425
Sterling,Ill.(1)(9) N15 ..... 5.675
Sterling,Ill.(9) N15 ..... 5.775
Struthers,O.(9) Y1 ..... 5.675
Tonawanda,N.Y. B12 ..... 5.675
Torrance,Calif.(9) C11 ..... 6.375
Warren,O. C17 ..... 6.025
Youngstown(9) R2, U5 ..... 5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.725
Bethlehem,Pa. B2 ..... 6.725
Bridgeport,Conn. C32 ..... 6.80
Buffalo R2 ..... 6.725
Canton,O. R2, T7 ..... 6.725
Clairton,Pa. U5 ..... 6.725
Detroit S41 ..... 6.725
Economy,Pa. B14 ..... 6.725
Ecorse,Mich. G5 ..... 6.725
Fairless,Pa. U5 ..... 6.875
Farrell,Pa. S3 ..... 6.725
Fontana,Calif. K1 ..... 7.775
Gary,Ind. U5 ..... 6.725
Houston S5 ..... 6.975
Ind.Harbor,Ind. I-2, Y1 ..... 6.725
Johnstown,Pa. B2 ..... 6.725
KansasCity,Mo. S5 ..... 6.975
Lackawanna,N.Y. B2 ..... 6.725
LosAngeles B3 ..... 7.775
Lowellville,O. S3 ..... 6.725
Massillon,O. R2 ..... 6.725
Midland,Pa. C18 ..... 6.725
Owensboro,Ky. G8 ..... 6.725
Pittsburgh J5 ..... 6.725
Sharon,Pa. S3 ..... 6.725
S.Chicago R2, U5, W14 ..... 6.725
S.Duquesne,Pa. U5 ..... 6.725
Struthers,O. Y1 ..... 6.725
Warren,O. C17 ..... 6.725
Youngstown U5 ..... 6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ..... 8.30
Bessemer,Ala. T2 ..... 8.30
Bethlehem,Pa. B2 ..... 8.30
Clairton,Pa. U5 ..... 8.30
Cleveland R2 ..... 8.30
Ecorse,Mich. G5 ..... 8.30
Fairfield,Ala. T2 ..... 8.30
Fontana,Calif. K1 ..... 9.00
Gary,Ind. U5 ..... 8.30
Houston S5 ..... 8.55
Ind.Harbor,Ind. Y1 ..... 8.30
Johnstown,Pa. B2 ..... 8.30
KansasCity,Mo. S5 ..... 8.55
Lackawanna,N.Y. B2 ..... 8.30
LosAngeles B3 ..... 9.00
Pittsburgh J5 ..... 8.30
Seattle B3 ..... 9.05
S.Chicago,Ill. R2, W14 ..... 8.30
S.Duquesne,Pa. U5 ..... 8.30
S.SanFrancisco B3 ..... 9.05
Struthers,O. Y1 ..... 8.30
Youngstown U5 ..... 8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa. (9) B2 ..... 5.825
Houston(9) S5 ..... 5.925
KansasCity,Mo.(9) S5 ..... 5.925
Lackawanna(9) B2 ..... 5.675
Sterling,Ill. N15 ..... 5.775
Sterling,Ill.(1) N15 ..... 5.675
Tonawanda,N.Y. B12 ..... 5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ..... 5.675
Atlanta A11 ..... 5.875
Joliet,Ill. P22 ..... 5.675
Minnequa,Colo. C10 ..... 6.125
Niles,Calif. P1 ..... 6.375
Pittsburgh J5 ..... 5.675
Portland,Oreg. O4 ..... 6.425
SanFrancisco S7 ..... 6.52
Seattle B3 ..... 6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy,Pa. B14 ..... 16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 7.05
KansasCity,Mo. S5 ..... 7.05
Pittsburgh J5 ..... 6.80
Youngstown U5 ..... 6.80

BARS, C.F. Leaded (Including leaded extra)
Carbon
LosAngeles P2, S30 ..... 11.75*

Alloy
Ambridge,Pa. W18 ..... 10.175
BeaverFalls,Pa. M12 ..... 10.175
Camden,N.J. P13 ..... 10.35
Chicago W18 ..... 10.175
Elyria,O. W8 ..... 10.175
Monaca,Pa. S17 ..... 10.175
Newark,N.J. W18 ..... 10.35
SpringCity,Pa. K3 ..... 10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ..... 7.65
BeaverFalls,Pa. M12,R2 ..... 7.65
Birmingham C15 ..... 8.25
Buffalo B5 ..... 7.70
Camden,N.J. P13 ..... 8.10
Carnegie,Pa. C12 ..... 7.65
Chicago W18 ..... 7.65
Cleveland A7, C20 ..... 7.65
Detroit B5, P17 ..... 7.85
Detroit S41 ..... 7.65
Donora,Pa. A7 ..... 7.65
Elyria,O. W8 ..... 7.65
FranklinPark,Ill. N5 ..... 7.65
Gary,Ind. R2 ..... 7.65
GreenBay,Wis. F7 ..... 7.65
Hammond,Ind. J5, L2 ..... 7.65
Hartford,Conn. R2 ..... 8.15
Harvey,Ill. B5 ..... 7.65
LosAngeles (49) S30 ..... 9.10
LosAngeles(49) P2, R2 ..... 9.10
Mansfield,Mass. B5 ..... 8.20
Massillon,O. R2, R8 ..... 7.65
Midland,Pa. C18 ..... 7.65
Monaca,Pa. S17 ..... 7.65
Newark,N.J. W18 ..... 8.10
NewCastle,Pa.(17) B4 ..... 7.65
Pittsburgh J5 ..... 7.65
Plymouth,Mich. P5 ..... 7.90
Putnam,Conn. W18 ..... 8.20
Readville,Mass. C14 ..... 8.20
S.Chicago,Ill. W14 ..... 7.65
SpringCity,Pa. K3 ..... 8.10
Struthers,O. Y1 ..... 7.65
Warren,O. C17 ..... 7.65
Waukegan,Ill. A7 ..... 7.65
Willimantic,Conn. J5 ..... 8.15
Youngstown F3, Y1 ..... 7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19 ..... 6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ..... 9.025
BeaverFalls,Pa. M12,R2 ..... 9.025
Bethlehem,Pa. B2 ..... 9.025
Bridgeport,Conn. C32 ..... 9.175
Buffalo B5 ..... 9.025
Camden,N.J. P13 ..... 9.20
Canton,O. T7 ..... 9.025
Carnegie,Pa. C12 ..... 9.025
Chicago W18 ..... 9.025
Cleveland A7, C20 ..... 9.025
Detroit B5, P17 ..... 9.225
Detroit S41 ..... 9.025
Donora,Pa. A7 ..... 9.025
Elyria,O. W8 ..... 9.025
FranklinPark,Ill. N5 ..... 9.025
Gary,Ind. R2 ..... 9.025
GreenBay,Wis. F7 ..... 9.025
Hammond,Ind. J5, L2 ..... 9.025
Hartford,Conn. R2 ..... 9.325
Harvey,Ill. R5 ..... 9.025
Lackawanna,N.Y. B2 ..... 9.025
LosAngeles P2, S30 ..... 11.00
Mansfield,Mass. B5 ..... 9.325
Massillon,O. R2, R8 ..... 9.025
Midland,Pa. C18 ..... 9.025
Monaca,Pa. S17 ..... 9.025
Newark,N.J. W18 ..... 9.20
Plymouth,Mich. P5 ..... 9.225
S.Chicago,Ill. W14 ..... 9.025
SpringCity,Pa. K3 ..... 9.20
Struthers,O. Y1 ..... 9.025
Warren,O. C17 ..... 9.025

Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft. Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1.5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ...6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ....5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ...5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ...7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ....7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Roll Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 .....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 .....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ...5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ...6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 .....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 .....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ....6.875†
Pittsburg,Calif. C11 ...7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 .....7.50
Youngstown J5 .....7.50

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N. Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
T2 Tenn. Coal & Iron
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.
U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.
V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.
W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2	5.10
Allenport, Pa. P7	5.10
Alton, Ill. L1	5.30
Ashland, Ky. (8) A10	5.10
Atlanta A11	5.10
Bessemer, Ala. T2	5.10
Birmingham C15	5.10
Conshohocken, Pa. A3	5.15
Detroit M1	5.10
Ecorse, Mich. G5	5.10
Fairfield, Ala. T2	5.10
Farrell, Pa. S3	5.10
Fontana, Calif. K1	5.825
Gary, Ind. U5	5.10
Ind. Harbor, Ind. I-2, Y1	5.10
Johnstown, Pa. (25) B2	5.10
Lackaw'na, N.Y. (25) B2	5.10
LosAngeles (25) B3	5.85
LosAngeles C1	8.60
Minnequa, Colo. C10	6.20
Riverdale, Ill. A1	5.10
SanFrancisco S7	6.60
Seattle (25) B3	6.10
Seattle N14	6.60
Sharon, Pa. S3	5.10
S. Chicago, Ill. W14	5.10
S. SanFrancisco (25) B3	5.85
SparrowsPoint, Md. B2	5.10
Torrance, Calif. C11	5.85
Warren, O. R2	5.10
Weirton, W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie, Pa. S18	8.40
Farrell, Pa. S3	8.40
Gary, Ind. U5	8.40
Houston S5	8.65
Ind. Harbor, Ind. Y1	8.40
KansasCity, Mo. S5	8.65
LosAngeles B3	9.60
Lowellville, O. S3	8.40
Newport, Ky. A2	8.40
Sharon, Pa. A2, S3	8.40
S. Chicago, Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland, Ky. A10	7.575
Bessemer, Ala. T2	7.575
Conshohocken, Pa. A3	7.575
Ecorse, Mich. G5	7.575
Fairfield, Ala. T2	7.575
Farrell, Pa. S3	7.575
Gary, Ind. U5	7.575
Ind. Harbor, Ind. I-2, Y1	7.575
Lackawanna, N.Y. B2	7.575
LosAngeles (25) B3	8.325
Seattle (25) B3	8.575
Sharon, Pa. S3	7.575
S. Chicago, Ill. W14	7.575
S. SanFrancisco (25) B3	8.325
SparrowsPoint, Md. B2	7.575
Warren, O. R2	7.575
Weirton, W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10	5.35
Warren, O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn, Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover, O. G6	7.425
Evanston, Ill. M22	7.525
Farrell, Pa. S3	7.425
Follansbee, W.Va. W10	7.425
Fontana, Calif. K1	9.20
FranklinPark, Ill. T6	7.525
Ind. Harbor, Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport, Pa. E10	7.525
NewBedford, Mass. R10	7.875
NewBritain, Conn. S15	7.875
NewCastle, Pa. B4, E5	7.425
NewHaven, Conn. D2	7.875
NewKensington, Pa. A6	7.425
Pawtucket, R.I. R3	7.975
Pawtucket, R.I. N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale, Ill. A1	7.525
Rome, N.Y. (32) R6	7.425
Sharon, Pa. S3	7.425
Trenton, N.J. (31) R5	8.875
Wallingford, Conn. W2	7.875
Warren, O. R2, T5	7.425
Worcester, Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie, Pa. S18	15.55
Cleveland A7	15.55
Dover, O. G6	15.55
Farrell, Pa. S3	15.55
FranklinPark, Ill. T6	15.55
Harrison, N.J. S18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville, O. S3	15.55
Pawtucket, R.I. N8	15.90
Riverdale, Ill. A1	15.55
Sharon, Pa. S3	15.55
Worcester, Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn, Mich. S3	10.80
Dover, O. G6	10.80
Farrell, Pa. S3	10.80
Ind. Harbor, Ind. Y1	10.80
Sharon, Pa. S3	10.80
Warren, O. R2	10.80

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie, Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn, Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover, O. G6	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M22	8.95	10.40	12.60	15.60	....
Farrell, Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria, O. S1	10.05	10.40	12.60	15.60	....
FranklinPark, Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison, N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain, Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle, Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven, Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington, Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket, R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome, N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon, Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton, N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford, Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren, O. T5	8.95	10.40	12.60	15.60	18.55
Worcester, Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	0.80C	1.05C	1.35C
Bristol, Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria, O. S1	19.05	22.15	....
FranklinPark, Ill. T6	19.20	23.30	28.15
Harrison, N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer, Mass. W12	18.85	....	....
Trenton, N.J. R5	18.85	22.95	27.80
Worcester, Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

Weirton, W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2 .....8.175

STRIP, C.R., Electrogalvanized

Cleveland A7	7.425*
Dover, O. G6	7.425*
Evanston, Ill. M22	7.525*
McKeesport, Pa. E10	7.50*
Riverdale, Ill. A1	7.525*
Warren, O. B9, S3, T5	7.425*
Worcester, Mass. A7	7.975
Youngstown S41, Y1	7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell, Pa. S3	7.50
Sharon, Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.825
Farrell, Pa. S3	5.525
Riverdale, Ill. A1	5.675
Sharon, Pa. S3	5.525
Youngstown U5	5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$9.10	$9.35	$9.75
Fairfield, Ala. T2	9.20	9.45	9.85
Fairless, Pa. U5	9.20	9.45	9.85
Fontana, Calif. K1	9.75	10.00	10.40
Gary, Ind. U5	9.10	9.35	9.75
GraniteCity, Ill. G4	9.20	9.45	9.60
IndianaHarbor, Ind. I-2, Y1	9.10	9.35	9.75
Irvin, Pa. U5	9.10	9.35	9.75
Niles, O. R2	9.10	9.35	9.75
Pittsburg, Calif. C11	9.75	10.00	10.40
SparrowsPoint, Md. B2	9.10	9.35	9.75
Weirton, W.Va. W6	9.10	9.35	9.75
Yorkville, O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa, Pa. J5 (21-27 Ga.)	....	7.90	8.10	....
IndianaHarbor, Ind. Y1 (20-27 Ga.)		7.90	....	....
Niles, O. R2 (20-27 Ga.)		7.90	8.10	8.30

TIN PLATE, Hot Dipped 1.25 lb Common Coke / 1.50 lb

Aliquippa, Pa. J5	$10.40	$10.65
Fairfield, Ala. T2	10.50	10.75
Fontana, Calif. K1	11.05	11.30
Gary, Ind. U5	10.40	10.65
Ind. Harb. Y1	10.40	10.65
Irvin, Pa. U5	10.40	10.65
Pitts., Calif. C11	11.05	11.30
Sp. Pt., Md. B2	10.40	10.65
Weirton, W.Va. W6	10.40	10.65
Yorkville, O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa, Pa. J5	$8.20
Fairfield, Ala. T2	8.30
Fairless, Pa. U5	8.30
Fontana, Calif. K1	8.85
Gary, Ind. U5	8.20
GraniteCity, Ill. G4	8.30
Ind. Harbor, Ind. I-2, Y1	8.20
Irvin, Pa. U5	8.20
Niles, O. R2	8.20
Pittsburg, Calif. C11	8.85
SparrowsPoint, Md. B2	8.20
Weirton, W.Va. W6	8.20
Yorkville, O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa, Pa. J5	7.85
Gary, Ind. U5	7.85
GraniteCity, Ill. G4	7.95
Ind. Harbor, Ind. Y1	7.85
Irvin, Pa. U5	7.85
Yorkville, O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary, Ind. U5	$10.05
Irvin, Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom, W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge, Pa. A4	....	....	12.40	13.35	14.65
GraniteCity, Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor, Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield, O. E6	9.875*	11.70	12.40	13.55	14.65
Newport, Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles, O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift, Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren, O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville, O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift, Pa. U5	8.10
Mansfield, O. E6	8.10
Warren, O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom, W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift, Pa. U5	15.70	16.30	16.80	17.85
Zanesville, O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge, Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler, Pa. A10	....	....	....	19.70	20.20	20.70	....
Vandergrift, Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren, O. R2	....	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity, Ala. R2	8.00
Aliquippa, Pa. J5	8.00
Alton, Ill. L1	8.20
Atlanta A1	8.00
Bartonville, Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville, Ind. M8	8.10
Donora, Pa. A7	8.00
Duluth A7	8.00
Fairfield, Ala. T2	8.00
Fostoria, O. (24) S1	8.10
Houston S5	8.25
Jacksonville, Fla. M8	8.35
Johnstown, Pa. B2	8.00
Joliet, Ill. A7	8.00
KansasCity, Mo. S5	8.25
Kokomo, Ind. C16	8.10
LosAngeles B3	8.95
Minnequa, Colo. C10	8.25
Monessen, Pa. P7, P16	8.00
Palmer, Mass. W12	8.30
Pittsburg, Calif. C11	8.95
Portsmouth, O. P12	8.00
Rankin, Pa. A7	8.00
S. Chicago, Ill. R2	8.00
S. SanFrancisco C10	8.95
SparrowsPoint, Md. B2	8.10
Sterling, Ill. (1) N15	8.00
Sterling, Ill. N15	8.10
Struthers, O. Y1	8.00
Waukegan, Ill. A7	8.00
Worcester, Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria, O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville, Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora, Pa. A7	12.65
Duluth A7	12.65
Johnstown, Pa. B2	13.40
KansasCity, Mo. U3	12.90
Minnequa, Colo. C10	12.775
Monessen, Pa. P7, P16	12.65
Muncie, Ind. I-7	13.60
NewHaven, Conn. A7	12.95
Palmer, Mass. W12	13.70
Pittsburg, Calif. C11	13.45
Portsmouth, O. P12	12.65
Roebling, N.J. R5	12.95
SparrowsPt., Md. B2	13.50
Struthers, O. Y1	13.40
Trenton, N.J. A7	12.95
Waukegan, Ill. A7	12.65
Worcester, Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa, Pa. J5	9.75
Alton, Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora, Pa. A7	9.75
Duluth A7	9.75
Johnstown, Pa. B2	9.75
KansasCity, Mo. S5, U3	10.00
Kokomo, Ind. C16	9.85
LosAngeles B3	10.70
Minnequa, Colo. C10	9.95
Monessen, Pa. P7, P16	9.75
NewHaven, Conn. A7	10.05
Palmer, Mass. W12	10.05
Pittsburg, Calif. C11	10.70
Portsmouth, O. P12	9.75
Roebling, N.J. R5	10.05
S. Chicago, Ill. R2	9.75
S. SanFrancisco C10	10.70
SparrowsPt., Md. B2	9.85
Struthers, O. Y1	9.75
Trenton, N.J. A7	10.05
Waukegan, Ill. A7	9.75
Worcester, Mass. A7	10.05

WIRE, MB Spring, High-Carbon

Aliquippa, Pa. J5	9.75
Alton, Ill. L1	9.95
Bartonville, Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora, Pa. A7	9.75
Duluth A7	9.75
Fostoria, O. S1	9.80
Johnstown, Pa. B2	9.75
KansasCity, Mo. S5, U3	10.00
LosAngeles B3	10.70
Millbury, Mass. (12) N6	10.05
Minnequa, Colo. C10	9.95
Monessen, Pa. P7, P16	9.75
Muncie, Ind. I-7	9.95
Palmer, Mass. W12	10.05
Pittsburg, Calif. C11	10.70
Portsmouth, O. P12	9.75
Roebling, N.J. R5	10.05
S. Chicago, Ill. R2	9.75
S. SanFrancisco C10	10.70
SparrowsPt., Md. B2	9.85
Struthers, O. Y1	9.75
Trenton, N.J. A7	10.05
Waukegan, Ill. A7	9.75
Worcester, Mass. A7, J4, T6	10.05

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1	16.50
Bartonville, Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville, Ind. M8	16.40
Fostoria, O. S1	16.30
Houston S5	16.55
Jacksonville, Fla. M8	16.65
Johnstown, Pa. B2	16.30
KansasCity, Mo. S5	16.55
Kokomo, Ind. C16	16.30
Minnequa, Colo. C10	16.55
Monessen, Pa. P16	16.30
Muncie, Ind. I-7	16.50
Palmer, Mass. W12	16.60
S. SanFrancisco C10	17.15
Waukegan, Ill. A7	16.30
Worcester, Mass. A7, J6	16.60

WIRE, Tire Bead

Bartonville, Ill. K4	17.15
Monessen, Pa. P16	17.15
Roebling, N.J. R5	17.65

ROPE WIRE (A)

Bartonville, Ill. K4	13.45
Buffalo W12	13.45
Fostoria, O. S1	13.45
KansasCity, Mo. U3	13.70
Johnstown, Pa. B2	13.45
Monessen, Pa. P7	13.45
Muncie, Ind. I-7	13.65
Palmer, Mass. W12	13.75
Portsmouth, O. P12	13.45
Roebling, N.J. R5	13.75
St. Louis L8	13.45
SparrowsPt., Md. B2	13.55
Struthers, O. Y1	13.45
Worcester, Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

Superior's new SENDZIMIR Mill

Close-up of the 18 back-up rolls providing tremendous power and rigidity to super-finished work rolls, for flawless precision strip production.

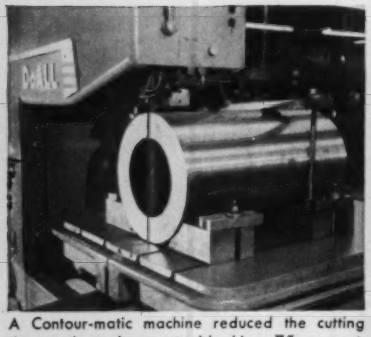
Fine-watch precision—
great power, rigidly controlled!

The ultimate in dimensional accuracy and finish is now available in Superior Strip Steel . . . in widths up to 24" . . . in larger and heavier coils . . . thanks to our new Sendzimir Mill with electronic continuous gage control. Strip is reduced to final gage at speeds reaching 1,000 feet per minute—every foot within required tolerances, beautifully finished for your most particular product requirements. Let us serve you with Superior Strip Steel *finer than the finest obtainable until now!* Write us about *your* requirements.

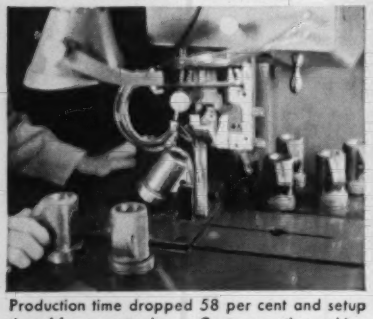
Superior
STRIP STEEL

SUPERIOR STEEL DIVISION
OF
COPPERWELD STEEL COMPANY
CARNEGIE, PENNSYLVANIA

For Export: Copperweld Steel International Company, New York

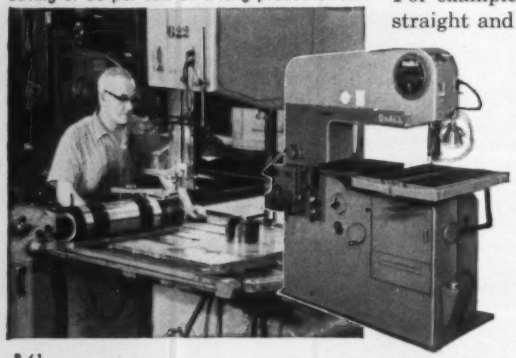


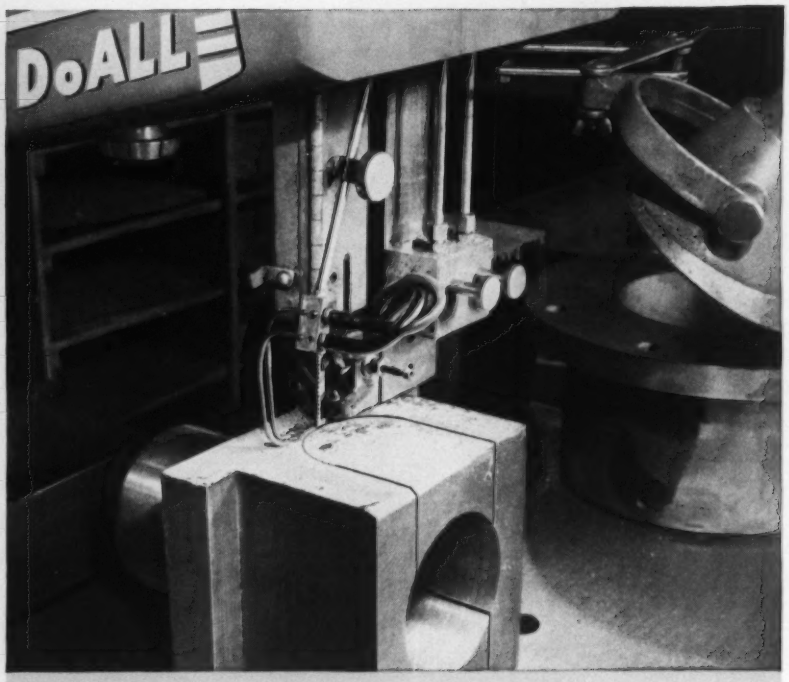
A Contour-matic machine reduced the cutting time on these chrome steel bushings 75 per cent.



Production time dropped 58 per cent and setup time 66 per cent when a Contour-matic machine took over the slotting job on these bronze fittings.

A Contour-matic machine saved 38 per cent in splitting time on this large dragline lagging. Below: heavy-wall cable housings shaped at a saving of 66 per cent on a long production run.





Value Analysis Will Prove Unbelievable Savings with Versatile *Contour-matic*® Band Machines

Contour-matic band machines and Demon® high-speed steel saw bands are achieving spectacular savings in tooling costs, time and material on hundreds of mass-production and job-lot runs today. These versatile machines make internal and external cuts 4 to 8 times faster than conventional machines, and with greater accuracy, better finish.

For example, in the above illustration a Contour-matic machine made both straight and contour cuts in this large welding machine part. First the sides were shanked. Then the center section was removed with a radius at the bottom. Other time-slashing applications are shown at the left. These are typical examples of how DoALL is helping step up productivity with its new Contour-matic band machines. The time saved can be used to save still more time on other jobs—on almost limitless applications.

Let a DoALL sales engineer show you how you can expand the range of your work, increase production and boost profits with Contour-matic band machines. He gladly will arrange an in-plant demonstration—no obligation. Four models, 4 throat sizes: 16, 26, 36, and 60 in. Call your local DoALL store today.

See the DoALL Exhibit in Booth 1226, ASTE Tool Show

8-61

This is a typical DoALL Store

The DoALL Company, Des Plaines, Illinois

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock — **Col.**

AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	175

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES — **Col.**

AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.49
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.79
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.84
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop — **Col.**

AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS — **Col.**

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed — **Col.**

AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga. — **Col.**

Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)	An'ld Galv. Stone	An'ld Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville,K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality (6 to 8 gage)

Ala.City,Ala. R2	9.00 9.55**
Aliquippa J5	8.65 9.325§
Atlanta(48) A11	9.10 9.775§
Bartonville(48) K4	9.85 19.90
Buffalo W12	9.00 9.55†
Cleveland A7	9.00 ....
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield T2	9.00 9.55†
Houston(48) S5	9.25 9.80**
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675§
Joliet,Ill. A7	9.00 9.55†
KansasCity(48)S5	9.25 9.80**
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625§
Minnequa C10	9.25 9.80**
Monessen(48) P7	8.65 9.35§
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55**
S.SanFran. C10	9.95 10.50**
Spar'wsPt.(48)B2	9.10 9.775§
St'ling(37)(48)N15	9.10 9.80
Struthers,O. Y1	9.00 9.65†
Worcester,Mass.A7	9.30 9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Consumer discounts, per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nuts 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

CAP AND SETSCREWS, Fillister Head, Cap Screws, Coarse Thread:

Packages	+55
Bulk	+16
Flat Head Cap Screws:	
¾ in. and smaller, 6 in. and shorter:	
Packages	+85
Bulk	+38
Setscrews, Square Head, Cup Point, Coarse Thread:	
Through 1 in. diam, 6 in. and shorter:	
Packages	+ 5
Bulk	+19
Through 1 in. diam., longer than 6 in.:	
Packages	+29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85
⅞ in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	29.85	43.00	55.40	73.00	95.10
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	28.95	43.40	55.40	73.00	95.10
Minnequa,Colo. C10	28.95	43.40	55.40	73.00	95.10
Roebling,N.J. R5	28.95	43.40	55.40	73.00	95.10
SparrowsPoint,Md. B2	28.95	43.40	55.40	73.00	95.10
St.Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Standard All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 12 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1¼		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp., American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co., Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates: Carbon Base 5%	10%	15%	20%	Sheets: Carbon Base 20%
Stainless	....	....	....	....	37.50
302	26.05	28.80	31.55	34.30	39.75
304	30.50	33.75	36.95	40.15	....
304L	38.20	42.20	46.25	50.25	58.25
316	42.30	46.75	51.20	55.65	....
316L	49.90	55.15	60.40	65.65	....
316 Cb	31.20	34.50	37.75	41.05	47.25
321	36.90	40.80	44.65	48.55	57.00
347	22.25	24.60	26.90	29.25	....
405	20.55	22.70	24.85	27.00	....
410	21.20	23.45	25.65	27.90	....
430	48.90	59.55	70.15	80.55	....
Inconel	41.65	51.95	63.30	72.70	....
Nickel	41.95	52.60	63.30	74.15	....
Nickel, Low Carbon	43.35	53.55	63.80	74.05	....
Monel					

	Strip, Carbon Base—Cold Rolled—10%	Both Sides
Copper*	$36.80	$44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% Silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.035% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS				PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	STRUCTURAL SHAPES	Carbon	Floor
Baltimore	8.53	10.00	10.06	....	10.94	9.33	11.80	16.38	9.92	9.15	10.50
Birmingham	9.43	10.20	10.46	....	10.41	9.09	13.14	16.78	9.00	9.29	10.90
Boston	9.63	10.40	11.77	53.50	11.60	9.91	13.35	16.59	10.52	9.71	11.28
Buffalo	8.80	9.95	11.15	55.98	10.65	9.00	11.45	16.30	9.65	9.00	10.85
Charlotte, N. C.	10.81	11.22	11.34	....	12.29	10.97	12.68	....	11.38	11.17	12.18
Chicago	8.74	10.20	10.95	53.00	10.40	8.84	10.65	15.95	9.33	8.67	10.46
Cincinnati	8.91	10.26	11.00	53.43	10.72	9.16	11.53	16.27	9.89	9.05	10.79
Cleveland	8.73	9.88	11.14	52.33	10.51	8.96	11.25	16.06	9.75	8.92	10.56
Dallas	10.07	10.81	12.59	....	11.68	9.53	12.98	16.95	9.74	9.87	11.52
Detroit	9.00	10.46	11.30	56.50	10.77	9.15	11.01	16.23	9.89	9.04	10.72
Houston	9.67	10.41	12.19	52.00	11.28	9.13	13.10	16.55	9.34	9.47	11.12
Indianapolis	9.18	10.64	11.39	....	10.84	9.28	11.09	16.39	9.77	9.11	10.90
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	9.95	11.55	12.20	57.60	11.55	9.75	14.20	17.35	10.00	10.00	11.85
Milwaukee	8.88	10.34	11.09	....	10.54	8.98	10.89	16.09	9.55	8.81	10.60
New York	9.36	10.13	11.35	53.08	11.46	9.74	13.25	16.40	10.20	9.51	11.05
Philadelphia	9.10	10.00	10.89	52.17	11.10	9.50	11.95	16.38	9.85	9.55	10.55
Pittsburgh	8.73	9.88	11.03	52.33	10.49	8.85	11.25	15.95	9.36	8.68	10.32
St. Louis	8.54	10.58	11.33	....	10.50	8.95	11.28	16.33	9.45	8.78	10.57
St. Paul	9.00	9.59	10.74	....	10.66	9.12	11.49	16.54	9.63	8.95	10.49
San Francisco	10.90	11.85	11.55	55.10	12.15	10.65	15.10	17.25	10.85	10.90	12.90
Seattle	11.55	12.30	12.50	56.52	12.65	11.10	16.20	17.80	11.20	11.00	13.10
Spokane, Wash.	11.55	12.30	12.50	57.38	13.15	11.60	16.20	17.80	11.20	11.00	13.60

Specifications: Hot rolled sheet, sheared edge, 10 Ga. x 36 x 96-120 in.; cold rolled sheets, 20 Ga. x 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, ¾ in.—2 11/16 in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, ¼ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Nario, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85§
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c)	
Annealed, 99.5% Fe. .36.75, ton, del. east of Mississippi.	
Unannealed (99+% Fe) 33.0 f.o.b.	
Unannealed (99+% Fe) (minus 325 mesh)	58.0 f.o.b.
Carbonyl Iron:	
98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500-lb drum freight allowed, c.l. 38.50; ton lots 40.50	
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	.35.10-52.20†
Bronze, 5000-lb lots	.53.10-56.70†
Copper, electrolytic	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 35 mesh	$1.00
Nickel	$1.15
Nickel-Silver, 5000-lb lots	.60.70-69.00†
Phosphor-Copper, 5000-lb lots	66.00
Copper (atomized) 5000-lb lots	.46.50-64.50
Solder	7.00*
Silicon	.70.00*
Stainless Steel, 304	.89.00
Stainless Steel, 316	$1.07
Tin	.14.00*
Zinc, 5000-lb lots	21.20-34.40‡
Tungsten: Carbon reduced, 98.8% min., minus 65 mesh	Dollars .nom.**
Chromium electrolytic 99.8% Cr, min., metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore. ††Welding grade.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00†
Brazilian iron ore, 68.5%	21.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.00-19.50
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian, 88-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†
South African Transvaal	
44% no ratio	18.00†
48% no ratio	24.00-26.00†
Turkish	
48% 3:1	36.00-37.00†
Domestic Rail nearest seller	
18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.50-2.75
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens:	
New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.95	$6.00	$5.85	$5.70	$6.10
Bar Size Angles	5.95	6.00	5.85	5.75	6.10
Structural Angles	5.86	5.91	5.76	5.66	6.01
I-Beams	5.86	5.91	5.76	5.66	6.01
Channels	5.86	5.91	5.76	5.66	6.01
Plates (basic bessemer)	5.98	6.03	5.88	5.78	6.13
Sheets, H.R.	7.50	7.55	7.40	7.30	7.65
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	9.70	9.75	9.60	9.50	9.85
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	9.60	9.65	9.50	9.40	9.75
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.08	24.20	24.42	24.15	25.47
Barbed Wire (†)	6.50	6.55	6.40	6.30	6.65
Merchant Bars	6.39	6.44	6.29	6.19	6.54
Hot-Rolled Bands	7.90	7.95	7.80	7.70	8.05
Wire Rods, Thomas Commercial No. 5	6.60	....	6.45	6.45	6.70
Wire Rods, O. H.	7.05	....	6.90	6.90	7.15
Bright Common Wire Nails (§)	7.80	7.85	7.50	7.60	7.95

†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	5.00
Toluene, one deg. (deld. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per net ton bulk, f.o.b. cars or trucks, plant.

Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa. 21-23% Mn, $102.50, 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50 as of Feb. 1. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net tons, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35 less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c.

Blocking Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c; No. 2 (Cr 58-63%, C 5-6%, Si 8-10%), 23.00c; No. 3 (Cr 58-63%, C 5-6%, Si 10-12%), 23.00c.

Refined Charge Chrome: No. 1 (Cr 50-55%, C 5% max, Si 2% max), 25.00c; No. 2 (Cr 56-60% C 5% max, Si 2% max), 25.00c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 31.50c per lb contained Cr; 0.010% max, 32.50c. Delivered.
Cr 67-71%, carload, lump, bulk, 0.025% max, 34.50c; 0.05% max, 33.50c; 0.10% max, 33.25c; 0.20% max, 33.00c; 0.50% max, 32.75c; 1.0% max, 32.50c; 1.5% max, 32.25c; 2.0% max, 32.00c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). SM x D, carload, bulk, 20.05c per lb of alloy carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 26.25c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 28.25c per lb contained Cr, 14.60c per lb contained Si; 0.75 in. x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, cariot, packed, 2" x D plate (about ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al 40%, Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb. of briquet; c.l., packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb of briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-3 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

Scrap Market Now Leveling Off

Prices holding on steel grades following recent sharp decline. Mill buying continues limited, with inventories substantial and ingot rate slipping

Scrap Prices, Page 146

• **Pittsburgh**—Brokers for a mill on the edge of the district offered dealers $35 a ton, delivered, for No. 1 heavy melting and $30 for No. 2 heavy melting. Prices for both grades were $1 below last month's figures. Sellers hope that firmness in railroad scrap foreshadows a general tightening of the market. Brokers' bids on several B&O grades were $1 above last month's prices. Dealers are encouraged by the railroad's refusal to sell random rails and brake shoes for prices that were bid. They think the resistance point has been reached.

• **Philadelphia** — Prices on most major grades of steel scrap are unchanged, due primarily to sustained export demand. At least four cargoes of steel scrap are expected to leave this port in April. However, there are some further revisions in prices. Low phos structurals and plates are quoted $38-$41, delivered; couplers, springs and wheels are $44; and No. 1 cupola cast is $41, with malleable $55-$56.

• **New York** — Brokers' buying prices are unchanged, except for 18-8 stainless sheets, clips, and solids, which are off $5 a ton to $190-$195. Domestic demand remains slow.

• **Chicago**—For the third straight week, the price structure has held steady. Consumer buying is negligible, but a leading district mill announced $33 as its April buying price for No. 1 industrial heavy melting steel. It is buying the material on an extremely selective and limited basis.

In the last week of March, two auto stamping plants in the area contracted for the sale of their April production of No. 1 factory bundles at prices equivalent to $36.50-$37 a gross ton, delivered Chicago. The same plants offered about 23,000 tons for April, which compares with about 28,000 tons in March, and nearly 35,000 tons in February.

Demand for the foundry grades of scrap continues slow.

• **Cleveland** — Trading is limited here and in the Valley with steelmaking operations slackening. Local area mills are operating at 95 per cent of capacity vs. 98 a week ago; Valley mills are down to 76 per cent from 79. Mill inventories are not being built up; April buying is limited. Some easing in prices on the cast iron grades is reported, reflecting slower foundry operations.

• **Buffalo**—The consumer price on No. 1 heavy melting steel declined $1 a ton as a result of a new mill

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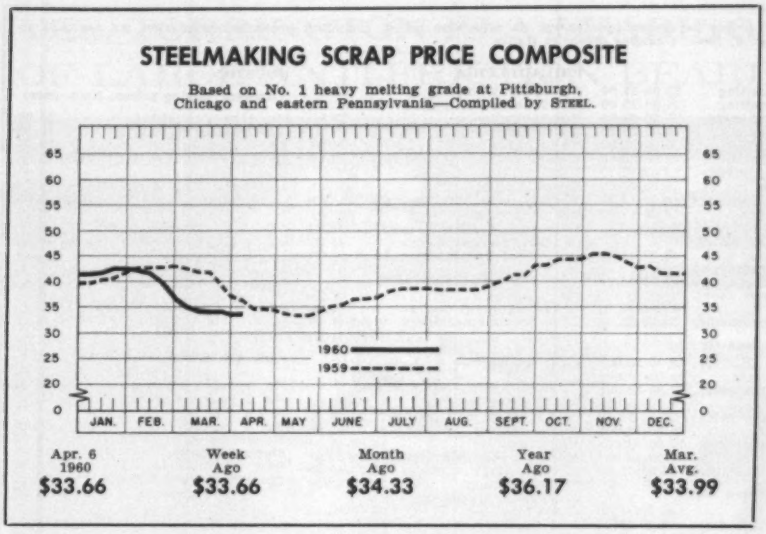

purchase. The top grade is now quoted $30-$31 but mills paid the prevailing prices for No. 2 heavy melting and No. 2 bundles, placing new orders for April shipment. The prevailing price on short shoveling turnings was also paid.

• **St. Louis** — Prices have slipped more. Buying is sluggish, and the mills having adequate inventories. Prices on most of the open hearth grades fell off $1 a ton last week. The price of 18 in. rails went down $4.

• **Cincinnati**—The market is quiet, but there is some buying being done for April shipment. The cast iron grades are quoted off $1-$2 a ton, with foundry activity slower.

• **Houston** — Brokers with mill orders are taking their time in covering commitments. Last month, dealers were hopeful export demand might strengthen the market. Since then, they've turned bearish. Western Gulf export quotations are few.

Mexican demand is good, but prices are unattractive. A Dallas broker quoted $35 for No. 1 heavy melting, and $32 for No. 2 heavy melting, delivered at the border. When an $8.50 freight is figured in, there is not much incentive for shippers except those in distress.

Houston brokers hold orders with the local mill which expire Apr. 30. Careful buying on those orders at the $34 level for No. 1 heavy melting constitutes the chief market activity.

• **Birmingham**—A district electric furnace released shipments held up since early in March, but it announced it probably wouldn't buy additional tonnage this month. With the exception of cast iron for pipe manufacturers, virtually no scrap is moving. The export market shows signs of picking up with the arrival of a vessel at Mobile and scheduled arrivals around Apr. 15 at other Southern ports.

• **Seattle**—The market is sluggish. Mills hold substantial inventories and export interest is limited. Prices are weak, but are holding at the lower levels recently established.

• **Los Angeles**—In the absence of demand, dealers would not be surprised if prices dropped $4 to $5 a ton. That would put No. 1 heavy melting at around $30 and No. 2 at $27.

• **San Francisco**—The market continues in the doldrums. No. 1 heavy melting has declined $1 a ton to $34, while No. 2 heavy melting is quoted at $30, No. 1 bundles at $34, and No. 1 cupola cast at $44.

Structural Shapes . . .

Structural Shape Prices, Page 134

Mild improvement is noted in demand for structural steel. Mostly small contracts are involved in current market activity, but expectations are that demand will broaden as the spring advances.

Wide flange beams are available for delivery in around five weeks. Standard shapes can be had in less time. One standard shape mill in the East may close down for a couple of weeks. It has built up a rounded inventory.

West Coast fabricators are awaiting word on the pending award of 3500 tons of transmission tower steel for a South Dakota project—bids were taken by the U. S. Bureau of Reclamation. No major bridge projects are up for figures in the area, but shop operators are hoping the usual spring surge in demand will develop soon.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 135

Reflecting seasonal influences, reinforcing steel bar demand is improving. Sellers have good size stocks, however, and are not pressing the mills for new tonnage deliveries. Construction work is picking

(*Please turn to Page* 151)

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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Apr. 6, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Apr. 6	$33.66
Mar. 30	33.66
Mar. Avg.	33.99
Apr. 1959	34.96
Apr. 1955	36.73

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	*29.00-30.00*
No. 1 dealer bundles	36.00-37.00
No. 2 bundles	*26.00-27.00*
No. 1 busheling	34.00-35.00
No. 1 factory bundles	41.00-42.00
Machine shop turnings	17.00-18.00
Mixed borings, turnings	17.00-18.00
Short turnings	24.00-25.00
Cast iron borings	24.00-25.00
Cut structurals:	
2 ft and under	41.00-42.00
3 ft and under	40.00-41.00
Heavy turnings	31.00-32.00
Punchings & plate scrap	*45.00-46.00*
Electric furnace bundles	*43.00-44.00*

Cast Iron Grades

No. 1 cupola	43.00-44.00
Stove plate	46.00-47.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	47.00-48.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	37.00-38.00
Rails, 2 ft and under	*59.00-60.00*
Rails, 18 in. and under	*60.00-61.00*
Random rails	53.00-54.00
Angles, splice bars	*46.00-47.00*
Railroad specialties	45.00-46.00
Rails, rerolling	64.00-65.00

Stainless Steel Scrap

18-8 bundles & solids	220.00-225.00
18-8 turnings	120.00-125.00
430 bundles & solids	120.00-125.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	32.00-33.00
No. 1 hvy melt., dealer	30.00-31.00
No. 2 hvy melting	28.00-29.00
No. 1 factory bundles	36.00-37.00
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	20.00-21.00
No. 1 busheling, indus.	32.00-33.00
No. 1 busheling, dealer	30.00-31.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	17.00-18.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals, 3 ft	38.00-39.00
Punchings & plate scrap	40.00-41.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	*40.00-41.00*
Unstripped motor blocks	39.00-40.00
Clean auto cast	53.00-54.00
Drop broken machinery	53.00-54.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
R.R. malleable	52.00-53.00
Rails, 2 ft and under	52.00-53.00
Rails, 18 in. and under	53.00-54.00
Angles, splice bars	45.00-46.00
Axles	51.00-52.00
Rails, rerolling	53.00-54.00

Stainless Steel Scrap

18-8 bundles, solids	210.00-215.00
18-8 turnings	110.00-115.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	17.00-18.00
No. 1 bundles	31.00-32.00
No. 2 bundles	15.00-16.00
No. 1 busheling	28.00-29.00
Machine shop turnings	12.00-13.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	10.00-11.00

Cast Iron Grades

No. 1 cupola	40.00-41.00
Stove plate	34.00-35.00
Heavy breakable	34.00-35.00
Unstripped motor blocks	26.00-27.00
Charging box cast	34.00-35.00
Clean auto cast	47.00-48.00

CLEVELAND

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	24.00-25.00
No. 1 factory bundles	37.50-38.50
No. 1 bundles	33.00-34.00
No. 2 bundles	20.00-21.00
No. 1 busheling	33.00-34.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	35.00-36.00
Cut structurals, plate 2 ft and under	43.00-44.00
Low phos. punchings & plate	34.00-35.00
Alloy free, short shovel turnings	17.00-18.00
Electric furnace bundles	34.00-35.00

Cast Iron Grades

No. 1 cupola	49.00-50.00†
Charging box cast	33.00-34.00†
Heavy breakable cast	35.00-36.00†
Stove plate	44.00-45.00†
Unstripped motor blocks	37.00-38.00
Brake shoes	35.00-36.00†
Clean auto cast	52.00-53.00†
Burnt cast	42.00-43.00†
Drop broken machinery	54.00-55.00

Railroad Scrap

R.R. malleable	*49.00-50.00*
Rails, 2 ft and under	56.00-57.00
Rails, 18 in. and under	57.00-58.00
Rails, random lengths	49.00-50.00
Cast steel	42.00-43.00
No. 1 railroad cast	52.00-53.00
Railroad specialties	45.00-46.00
Angles, splice bars	45.00-46.00
Rails, rerolling	60.00-61.00

Stainless Steel (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	205.00-210.00†
18-8 turnings	105.00-110.00†
430 clips, bundles, solids	110.00-115.00†
430 turnings	35.00-45.00†

YOUNGSTOWN

No. 1 Heavy melting	36.00-37.00
No. 2 heavy melting	27.00-28.00†
No. 1 busheling	36.00-37.00
No. 1 bundles	36.00-37.00
No. 2 bundles	23.00-24.00
Machine shop turnings	15.00-16.00
Shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	37.00-38.00
Electric furnace bundles	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt.	37.00-38.00

BUFFALO

No. 1 heavy melting	*30.00-31.00*
No. 2 heavy melting	27.00-28.00
No. 1 bundles	*30.00-31.00*
No. 2 bundles	23.00-24.00
No. 1 busheling	*30.00-31.00*
Shovel turnings	21.00-22.00
Machine shop turnings	17.00-18.00
Cast iron borings	19.00-20.00
Low phos. structurals and plate, 2 ft and under	41.00-42.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	45.00-46.00
No. 1 machinery	49.00-50.00

Railroad Scrap

Rails, random lengths	44.00-45.00
Rails, 3 ft and under	50.00-51.00
Railroad specialties	41.00-42.00

CINCINNATI

(Broker's buying prices; f.o.b. shipping point)

No. 1 heavy melting	31.50-32.50
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.50-32.50
No. 2 bundles	21.00-22.00
No. 1 busheling	31.50-32.50
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Shovel turnings	18.00-19.00
Cast iron borings	18.00-19.00
Low phos. 18 in.	44.00-45.00

Cast Iron Grades

No. 1 cupola	*41.00-42.00*
Heavy breakable cast	*36.00-37.00*
Charging box cast	*38.00-39.00*
Drop broken machinery	*51.00-52.00*

Railroad Scrap

No. 1 R.R. heavy melt.	37.00-38.00
Rails, 18 in. and under	*53.00-54.00*
Rails, random lengths	48.00-49.00

PHILADELPHIA

No. 1 heavy melting	35.00
No. 2 heavy melting	31.00
No. 1 bundles	37.00
No. 2 bundles	22.00
No. 1 busheling	37.00
Electric furnace bundles	38.00
Mixed borings, turnings	19.00†
Shovel turnings	23.00†
Machine shop turnings	19.00†
Heavy turnings	29.00†
Structurals & plates	*38.00-41.00*
Couplers, springs, wheels	*44.00*
Rail crops, 2 ft & under	58.00-60.00

Cast Iron Grades

No. 1 cupola	*41.00*
Heavy breakable cast	42.00
Drop broken machinery	51.00-52.00
Malleable	*55.00-56.00*

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	31.00-32.00
No. 2 bundles	16.00-17.00
Machine shop turnings	8.00-9.00†
Mixed borings, turnings	9.00-10.00
Shovel turnings	12.00-13.00†
Low phos. structurals & plates	38.00-39.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	34.00-35.00

Stainless Steel

18-8 sheets, clips, solids	*190.00-195.00*
18-8 borings, turnings	90.00-95.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	75.00-80.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*26.00-27.00*
No. 2 heavy melting	*22.00-23.00*
No. 1 bundles	*26.00-27.00*
No. 1 busheling	*26.00-27.00*
Machine shop turnings	6.00-7.00
Shovel turnings	11.00-12.00
No. 1 cast	39.00-40.00
Mixed cupola cast	33.00-34.00
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	21.00-22.00
No. 1 busheling	*35.00-36.00*
Cast iron borings	12.00-13.00
Machine shop turnings	21.00-22.00
Shovel turnings	22.00-23.00
Bar crops and plate	41.00-42.00
Structurals & plate	40.00-41.00
Electric furnace bundles	*35.00-36.00*
Electric furnace:	
3 ft and under	*33.00-34.00*
2 ft and under	*34.00-35.00*

Cast Iron Grades

No. 1 cupola	48.00-49.00
Stove plate	48.00-49.00
Charging box cast	29.00-30.00
Unstripped motor blocks	38.00-39.00
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
Rails, 18 in. and under	50.00-51.00
Rails, random lengths	45.00-46.00
Angles, splice bars	42.00-43.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*33.00*
No. 2 heavy melting	*31.00*
No. 1 bundles	*35.00*
No. 2 bundles	22.00
No. 1 busheling	*35.00*
Machine shop turnings	15.50
Shovel turnings	18.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	41.00†
Heavy breakable cast	*40.00†*
Unstripped motor blocks	*39.00†*
Clean auto cast	*50.00*
Stove plate	42.00

Railroad Scrap

No. 1 R.R. heavy melt.	*35.00*
Rails, 18 in. and under	*46.00†*
Rails, random lengths	45.00
Rails, rerolling	56.00†
Angles, splice bars	*44.00†*

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	34.00
No. 2 heavy melting	31.00
No. 2 bundles	19.00
Machine shop turnings	13.00-13.50
Shovel turnings	17.00
Low phos. plate & structurals	38.00-39.00

Cast Iron Grades

No. 1 cupola	38.50-39.00
Heavy breakable	29.00†
Foundry malleable	35.50-36.00
Unstripped motor blocks	32.50-33.50

Railroad Scrap

No. 1 R.R. heavy melt.	34.00†

LOS ANGELES

No. 1 heavy melting	35.00
No. 2 heavy melting	32.00
No. 1 bundles	31.00
No. 2 bundles	16.00
Machine shop turnings	16.00
Shovel turnings	16.00
Cast iron borings	16.00
Cut structurals and plate 1 ft and under	46.00-47.00

Cast Iron Grades

No. 1 cupola	44.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

PORTLAND, OREG.

No. 1 heavy melting	33.00
No. 2 heavy melting	29.00
No. 1 bundles	29.00
No. 2 bundles	24.00
Shovel turnings	16.00
Electric furnace bundles	43.00

Cast Iron Grades

No. 1 cupola	31.00
Heavy breakable	26.00
Unstripped motor blocks	24.00
Stove plate	21.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	32.00
No. 2 heavy melting	28.00
No. 1 bundles	28.00
No. 2 bundles	23.00
Machine shop turnings	15.00
Mixed borings, turnings	15.00
Electric furnace No. 1.	42.00

Cast Iron Grades

No. 1 cupola	30.00
Heavy breakable cast	25.00
Unstripped motor blocks	23.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	*34.00*
No. 2 heavy melting	*30.00*
No. 1 bundles	*30.00*
No. 2 bundles	20.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	*44.00*
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices)

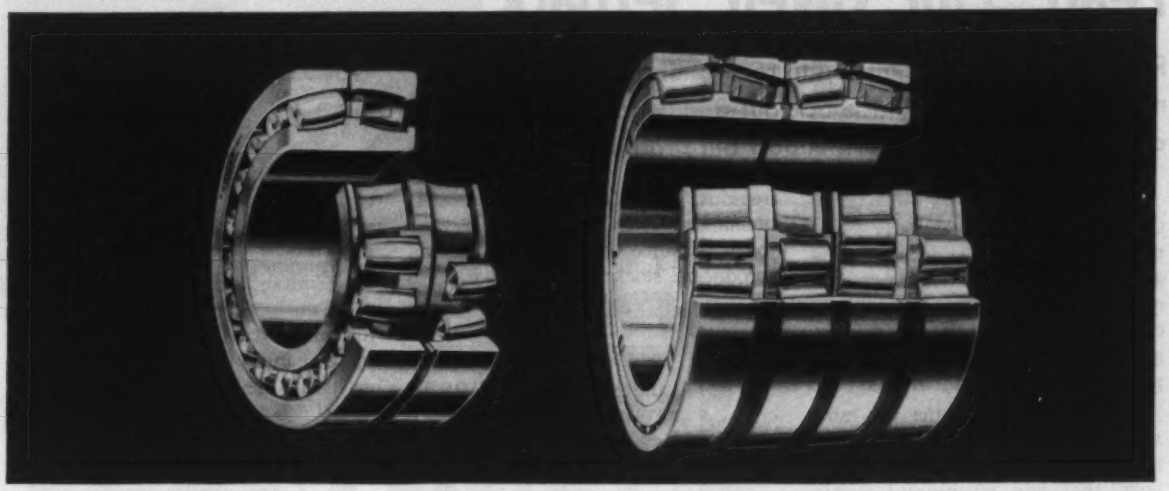
No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	24.00
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory:	
Prepared	32.25
Unprepared	26.25
Shovel turnings	17.00

Cast Iron Grades‡

No. 1 machinery cast	46.50-48.00

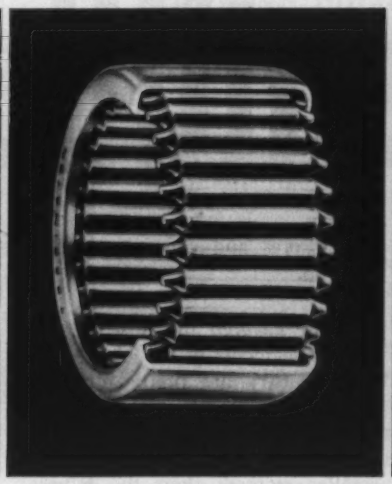
†Nominal.
‡F.o.b. Hamilton, Ont.

YES, TORRINGTON IS A LEADING MANUFACTURER OF LARGE ANTI-FRICTION BEARINGS...

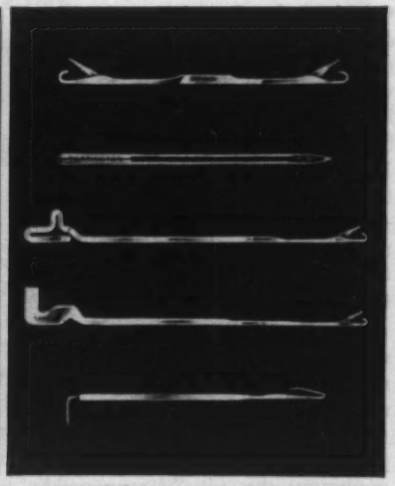


BUT THIS, TOO, IS TORRINGTON...

Foremost producer of small precision metal parts, manufactured by the millions to meet the mass demands of a variety of industries.



Pioneer manufacturer of the revolutionary needle bearings now used in countless products, from aircraft to home appliances.



America's largest manufacturer of machine needles for knitting, sewing, tufting and felting... and a leading producer of surgeons needles.

In these and many other fields throughout the world Torrington is contributing to

PROGRESS THROUGH PRECISION

THE TORRINGTON COMPANY

Torrington, Connecticut

Serving industry from plants located in the United States, Canada, England, Germany and Italy

Lead, Zinc Given Setback

Refusal of Tariff Commission to recommend legislation, which metalmen hoped would knock out quotas and install tariffs, disappoints trade. Future import bill probable

Nonferrous Metal Prices, Pages 150 & 151

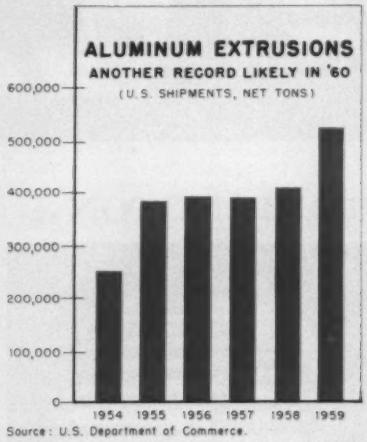
CONGRESS will eventually come up with higher import duties on lead and zinc to replace the system of quotas now in effect and to still the clamor from domestic interests for greater protection against lower price foreign ores and metals.

Metalmen who predict the move as the only means of solving certain industry problems doubt, however, that any meaningful legislation will become law until a new administration takes over.

• **Setback for Senators** — A bitter disappointment to mine state senators and many lead-zinc men came when the U. S. Tariff Commission by a 4-2 vote tossed the problem of imports back to Congress. Nowhere in the 300 page manuscript was there any majority recommendation —rather the four Democrat commissioners asserted they didn't have the authority to make recommendations to Congress.

Not so the Republican commissioners, who in a lengthy minority report recommended that Congress up import duties to 3 cents a pound (now 1.1) on lead and 2.5 cents a pound (now 0.7) on zinc, necessary minimums, they say, "if a reasonable opportunity is to be provided for U. S. lead and zinc mines to operate on a sound and stable basis." They also called for junking the administration backed system of quotas, in effect since October, 1958, as not being sufficiently restrictive to protect domestic interests.

• **Quotas Never Popular**—The quota system, which limits imports of the two metals, never has had strong support. Domestic miners and some fabricators argue quotas are too high, that they don't offer price protection against lower price imports, and that foreign mill shapes aren't covered. The smelters are just as opposed but for different reasons. They claim that supply and demand, particularly for zinc, will be in balance this year, that U. S. producers' stocks will go down, and that we need a free movement of foreign ores and concentrates into the U. S.



Source: U.S. Department of Commerce.

• **Tariff Favored by Most** — The various segments of the U. S. lead-zinc industry are pretty much in agreement that the answer is to eliminate quotas and raise import duties, though the smelters favor a smaller increase than the miners. Duties on the order of those recommended by the two dissident commissioners aren't as high as some would like but would probably be "acceptable" to the majority. In fact, a bill is being readied in the House calling for acceptance of the minority recommendations.

• **More Hearings**—The House will resume hearings Apr. 14 on a bill to grant subsidy payments to small Western miners. That group has been the hardest hit by the end of subsidy and stockpile programs and the resultant overabundance of metal on the world market. Some Washington sources believe the bill has more chance of passage than a higher tariff measure even though it would face stiff opposition and wouldn't offer any long term solution.

The Senate plans a one day meeting with industry representatives Apr. 19. It may be that a battle plan to seek remedial legislation will come out of this gathering, but Capitol Hill observers can't see any early passage of a broad scale bill.

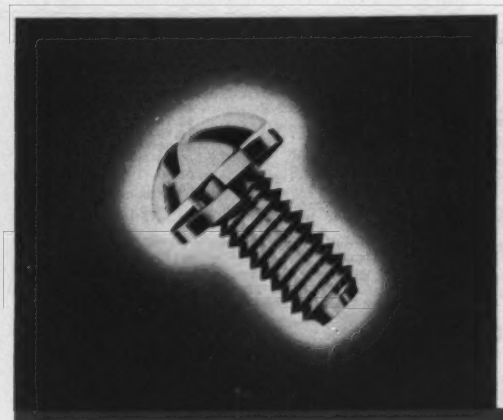
Explosion in Extrusions

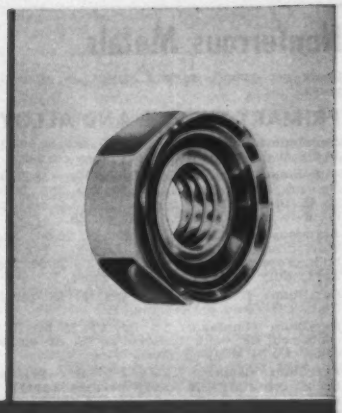
Chalk up aluminum extrusions as one of the fastest growing markets in the field of metals. In the short five year span, 1954-1959, production and shipments doubled (see graph), says the Business & Defense Services Administration. The number of companies producing aluminum extrusions increased 52 per cent, from 85 to 129, and the number of extrusions plants jumped to a total of 148 in 27 states. (Michigan and Ohio lead with 21 plants each.) At the beginning of the year, 361 extrusion presses were in operation, 69 per cent over 1954.

NONFERROUS PRICE RECORD

	Apr. 6 Price	Last Change	Previous Price	Mar. Avg	Feb. Avg	Apr., 1959 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	26.000	26.000	24.700
Copper	33.00	Mar. 10, 1960	33.00–35.00	33.296	34.000	32.404
Lead	11.80	Dec. 21, 1959	12.30	11.800	11.800	10.992
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	99.50	Apr. 6, 1960	99.625	100.227	101.170	102.490
Zinc	13.00	Jan. 8, 1960	12.50	13.000	13.000	11.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig, 99.8%, Velasco, Tex.

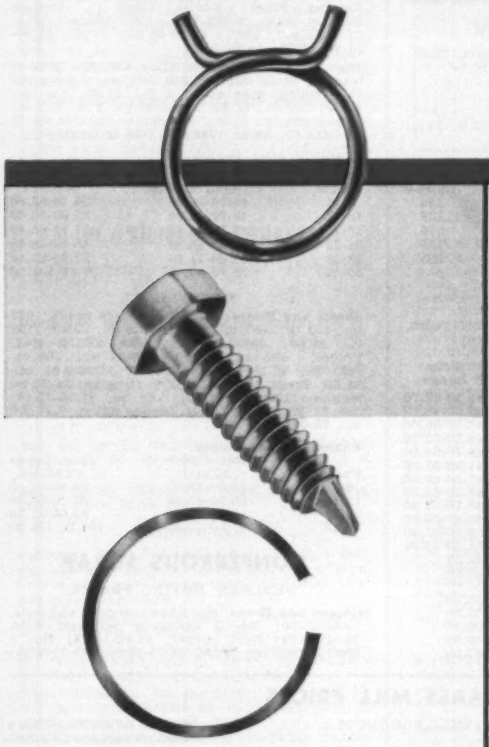




EATON-RELIANCE

FASTENERS

unseen muscles in assembled products



Because the initial cost of a fastener represents only a minor part of the total cost of "using" it in an assembly, the bulk of your fastener savings will come from these features: engineering assistance to insure use of proper fastener, ease of handling on the assembly line, stock availability and service. Metal quality, strength, vibration resistance, durability and manufacturer's reputation are also important parts of your "fastener package."

You can get all of these things by specifying Eaton-Reliance fasteners. They've been used by manufacturers of assembled products for almost half a century.

Write for our new 16 page full line catalog containing complete information.

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RELIANCE DIVISION
MANUFACTURING COMPANY
514 CHARLES AVENUE • MASSILLON, OHIO

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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.60; No. 43, 25.90; No. 195, 30.70; No. 214, 31.50; No. 356, 26.30. 30 lb ingots; 10 lb ingots, add 0.4 cent per lb; 6 lb ingots, add 0.6 cent per lb.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.00-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.50 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg, $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, 33.00; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis. New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $213-215 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.00 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 99.50.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.50-4.25.

Zinc: Prime western, 13.00; brass special, 13.25; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 14.50; special high grade, 14.75 deld. Diecasting alloy ingot No. 3, 16.50; No. 2, 17.00; No. 5, 16.75 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 27.25-29.00; No. 12 foundry alloy (No. 2 grade), 25.00-25.25; 5% silicon alloy, 0.60 Cu max., 25.50-25.75; 13 alloy, 0.60 Cu max., 25.50-26.00; 195 alloy, 27.75-28.75; 108 alloy, 25.25-25.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.50; grade 2, 24.25; grade 3, 23.25; grade 4, 22.75.

Brass Ingot: Red brass, No. 115, 29.25; tin bronze, No. 225, 39.50; No. 245, 34.00; high-leaded tin bronze, No. 305, 33.75; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 28.25.

Magnesium Alloy Ingot: A63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lots, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $4.00-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base, f.o.b. customer custody.

Thickness Range (in.)	Widths (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.10-47.70
0.136-0.096	24-72	72-180	45.50-48.70
0.096-0.077	24-72	72-180	46.20-50.00
0.077-0.068	24-72	72-180	46.70-51.70
0.068-0.061	24-72	72-180	46.70-55.50
0.061-0.048	24-72	72-180	47.30-57.30
0.048-0.038	24-72	72-180	47.80-60.20
0.038-0.030	24-72	72-180	48.20-65.30
0.030-0.024	24-60	72-180	48.70-56.60
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-36	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	44.60	49.40
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base, 12 ft lengths.

Diam.	Round		Hexagonal	
(in.)*	2011-T3	2017-T4	2011-T3	2017-T4
0.125	72.90	75.80	....	....
0.188	....	....	....	78.20
0.250	58.00	61.60	70.70	72.30
0.375	57.20	62.40	69.00	70.50
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	57.20	62.40	69.00	70.50
0.625	57.20	62.40	65.80	66.60
0.750	55.70	60.70	59.60	62.60
0.875	55.70	60.70	59.60	62.60
1.000	55.70	60.70	59.60	62.60
1.125	53.30	58.30	57.50	60.40
1.250	53.30	58.30	57.50	60.40
1.375	53.30	58.30	57.50	60.40
1.500	53.30	58.30	57.50	60.40
1.625	51.00	55.60	....	58.20
1.750	51.00	55.60	56.30	58.20
1.875	51.00	55.60	....	58.20
2.000	51.00	55.60	56.30	58.20
2.250	49.50	54.00	....	58.20
2.500	49.50	54.00	....	58.20
2.750	47.90	52.20	....	58.20
3.000	47.90	52.20	....	58.20
3.250	....	52.20	....	....
3.375	....	52.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.20-56.90; 6061, 43.20-56.90; 7075, 61.50-71.20; 7079, 66.50-76.20.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 31.53; 1¼ in., 42.75; 1½ in., 51.05; 2 in., 61.70; 3 in., 123.40; 4 in., 169.55; 5 in., 229.60; 6 in., 304.60; 8 in., 458.40; 10 in., 796.45 (3-24 ft lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	44.70-46.20	53.20-59.00
15-17	44.70-46.20	55.60-60.80
18-23	45.20-46.80	57.70-66.40
24-32	45.20-46.80	65.60-78.80
33-38	48.80-51.40	82.30-93.40
39-44	58.70-62.40	99.90-121.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	94.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.25-23.50; No. 2 heavy copper and wire, 20.50-20.75; light copper, 18.00-18.25; No. 1 composition red brass, 16.00-16.50; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 33.00c)		
	Sheets, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	57.13b	54.86c	....	58.32	29.000	29.000	28.250
Yellow Brass	50.57	36.06d	50.86	54.23	22.250	21.250	20.250
Low Brass, 80%	53.53	53.22	53.82	57.09	24.750	24.500	24.000
Red Brass, 85%	54.58	54.27	54.87	58.14	25.750	25.500	25.000
Com. Bronze, 90%	56.17	55.86	56.46	59.48	26.750	26.500	26.000
Manganese Bronze	58.86	52.21	62.69	....	20.875	26.625	19.875
Muntz Metal	53.20	48.26	....	....	20.875	20.625	20.125
Naval Brass	55.12	48.68	61.43	58.78	20.750	20.500	20.000
Silicon Bronze	62.86	61.80	62.15	80.79	28.375	28.125	27.375
Nickel Silver, 10%	65.98	68.06	68.06	....	26.875	26.625	14.937
Phos. Bronze	77.44	78.19	77.69	79.37	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 15.00-15.50; new brass clippings, 14.50-15.00; light brass, 10.50-11.00; heavy yellow brass, 11.50-12.00; new brass rod ends, 12.00-12.25; auto radiators, unsweated, 12.50-13.00; cocks and faucets, 13.00-13.50; brass pipe, 13.00-13.50.

Lead: Soft scrap lead, 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 8.00-8.25; mixed babbitt, 9.00-9.50.

Monel: Clippings, 27.00-28.00; old sheets, 23.00-24.00; turnings, 20.00-22.00; rods, 27.00-28.00.

Nickel: Sheets and clips, 53.00-54.00; rolled anodes, 53.00-54.00; turnings, 41.00-42.00; rod ends, 53.00-54.00.

Zinc: Old zinc, 4.00-4.50; new diecast scrap, 4.00-4.50; old diecast scrap, 2.25-2.75.

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 15.00-15.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 12.00-12.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 12.50-13.00; clean borings and turnings, 9.00-9.50; segregated low copper clips, 16.50-17.00; segregated high copper clips, 15.50-16.00; mixed low copper clips, 15.50-16.00; mixed high copper clips, 15.00-15.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.75-12.00; clean borings and turnings, 10.50-11.00; segregated low copper clips, 15.50-16.00; segregated high copper clips, 14.50-15.00; mixed low copper clips, 15.00-15.50; mixed high copper clips, 14.00-14.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.
Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 24.00; light copper, 22.00; refinery brass (60% copper) dry copper content, 21.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 24.00; light copper, 22.00; No. 1 composition borings, 20.50; No. 1 composition solids, 21.00; heavy yellow brass solids, 15.25; yellow brass turnings, 14.00; radiators, 16.25.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.50.

Copper: Flat-rolled, 50.04; oval, 48.00; 5000-10,000 lb; electrodeposited, 42.00; 2000-5000 lb lots; cast, 44.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 118.50; 200-499 lb, 117.00; 500-999 lb, 116.50; 1000 lb or more, 116.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.40 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb. 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 78.50; 100-600 lb, 69.20; 700-1900 lb, 66.40; 2000-9900 lb, 64.60; 10,000 lb or more, 63.30.

Stannous Chloride (Anhydrous): 25 lb, 153.80; 100 lb, 148.90; 400 lb, 146.50; 800-19,900 lb, 105.60; 20,000 lb or more, 99.50.

Stannous Sulphate: Less than 50 lb, 139.00; 50 lb, 109.00; 100-1900 lb, 107.00; 2000 lb or more, 105.00.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 145*)

up and that is expected to provide sufficient volume over coming weeks to keep mill operations at fairly high level through the second quarter.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

460 tons, underground service facilities, Pottstown, Pa., for American Telephone & Telegraph Co., to Bethlehem Fabricators, Bethlehem, Pa.

STRUCTURAL STEEL PENDING

850 tons, also unstated reinforcing tonnage; leg extensions and other accessories, transmission line construction in Washington State; two schedules; bids to Bonneville Power Administration, Portland, Oreg., Apr. 20 and May 12.

518 tons, state bridgework, Sec. 2-A, Lackawanna County (prestressed concrete, alternate); Central Pennsylvania Quarry Stripping & Construction Co., Hazelton, Pa., low on general contract.

415 tons, state bridgework, New Castle County, Delaware; bids Apr. 13.

385 tons, substation buildings and approach towers, Ft. Thompson project, South Dakota; bids May 3 to Bureau of Reclamation, Denver.

361 tons, state bridgework, Sec. 1-C, Lackawanna County, Pennsylvania; also 260 tons, with prestressed concrete alternate; Central Pennsylvania Quarry Stripping & Construction Co., Hazelton, Pa., low on general contract.

191 tons, state bridgework, Allegheny County, Pennsylvania; bids May 6.

165 tons, Kelley Road Bridge, Orono, Maine; bids Apr. 13 to Augusta.

100 tons or more, seven story office building, Juneau, Alaska; bids in.

Unstated, two Alaska bridge projects; bids to Alaska Department of Public Works, Juneau, Apr. 19; state to furnish three used high truss spans; bids for erection.

Unstated, addition to Physicians' Hospital, Portland, Oreg.; general award to Charles R. Campian Co., Portland, at $375,474.

Unstated, steel frame reactor facility at Idaho testing station; Technical Constructors Inc., Dallas, low at $963,088 to the Atomic Energy Commission.

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MANUFACTURING MANAGER - OPERATIONS MANAGER—Heavy Equipment, Metal Stampings, all related operations machining, welding, assembly, excelling in tool design, product design, and composite experience. Experience in export and import procedures, speak Spanish and Tagalog. Prefer medium sized firm with good potential. Salary in five figure bracket with benefits. Age 49. Resume sent on request to principals. Write Box 846, STEEL, Penton Bldg., Cleveland 13, Ohio.

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(3) E16 Solid Half Couplings

#14 FARREL-BIRMINGHAM
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(1) Floating Shaft Consisting Of: 2—#14 Flex. Half Couplings and 1 Shaft 14" Dia. x 7' 6⅝" Lg.
(5) Floating Shafts Each Consisting Of: 2—#14 Solid Half Couplings and 1 Shaft 14" Dia. x 8' 7¼" Lg.
(5) #14 Flex. Half Couplings
(6) #14 Shells
(6) #14 Hubs
(6) #14 End Covers
(6) #14 Solid Half Couplings

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(1) #12 Shell
(1) #12 Hub
(1) #12 End Cover
(2) #12 Solid Half Couplings

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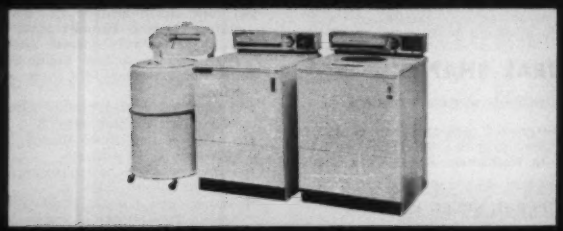

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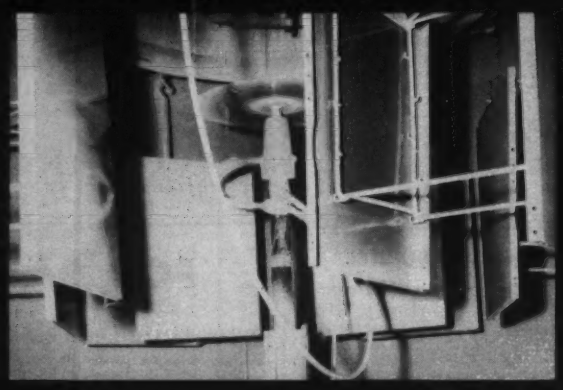

RANSBURG NO. 2 PROCESS

Kelvinator Division of American Motors switched from hand spray to RANSBURG No. 2 PROCESS Electro-Spray to meet increased production schedules . . . improve the quality of the finish . . . and lower finishing costs.

SAVINGS EXCEEDED EXPECTATIONS

Demonstration tests in the Ransburg labs indicated substantial savings in finishing costs, but in actual production, SAVINGS ARE EVEN GREATER than estimated. That's why Kelvinator is now considering RANSBURG Electrostatic Spray Painting for other products of their "white goods" line: Refrigerators . . . Home Freezers . . . Ice Cream Cabinets . . . Electric Ranges, as well as some components.

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RANSBURG

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Electro-Coating Corp.
Box-23122, Indianapolis 23, Indiana

REINFORCING BARS . . .

REINFORCING BARS PLACED

570 tons, Henry Landis Hospital, Philadelphia, for Pennsylvania General State Authority to Sweet's Steel Co., Williamsport, Pa., through McCloskey & Co., Philadelphia.

400 tons, Sears, Roebuck & Co., store, Spokane, Wash., to Northwest Steel Rolling Mills Inc., Seattle; Max J. Kuney Co., Spokane, general contractor.

345 tons, plant expansion, Alan Wood Steel Co., Conshohocken, Pa., to Taylor-Davis Inc., Philadelphia.

300 tons, men's hall, Washington State University, Pullman, Wash., to Northwest Steel Rolling Mills Inc., Seattle; H. Halvorson Inc., Yardley, Wash., general contractor.

225 tons, high school, Phillipsburg, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

80 tons, House of the Good Shepherd, Spokane, Wash., to Pacific Coast Div., Bethlehem Steel Co., Seattle; Max J. Kuney, Spokane, general contractor.

77 tons, store and office building, Anchorage, Alaska, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Howard Lease, Seattle, general contractor.

REINFORCING BARS PENDING

300 tons, hatch cover frames, Tuscarora powerplant, Niagara Falls, N. Y.; bids Apr. 14, State Power Authority, New York.

285 tons, junior high school, Riverhead, N. Y., bids closed.

100 tons or more, 70 man steel frame barracks, Annette Island, Alaska; Inlet Co. Inc., Anchorage, Alaska, low at $390,000; alternative $499,000; bid to the U. S. Coast Guard.

100 tons, 60 ton overhead electric crane for Cougar Dam powerhouse, Oregon; Cyclops Iron Works, San Francisco, low at $72,294 to the U. S. Engineer, Portland, Oreg.

470 tons, stream improvement structures, Mill Brook, Worcester, Mass.; Barletta Co. Inc., Roslindale, Mass., low on the general contract.

290 tons, Port of Seattle terminal pier; General Construction Co., Seattle, low at $1,655,854.

236 tons, state highway bridge, Beaver County, Pennsylvania; Apr. 29.

277 tons, Basin Road Interchange, New Castle County, Delaware, for the State Highway Department, bids Apr. 13; also, 413 tons of structurals required.

230 tons, library, Central Washington College, Ellensburg, Wash.; Newland Construction Co., Everett, Wash., low at $944,566.

200 tons, two men's dormitories, Washington State University, Pullman; H. Halvorson Inc., Yardley, Wash., low at $1,596,789.

200 tons, also miscellaneous, Frenchmen Hills and Hope Valley pumping plants, Columbia Basin project; Lewis Hopkins, Pasco, Wash., low at $252,858 and $128,379, respectively, to Bureau of Reclamation, Ephrata, Wash.

200 tons or more, two dormitories and dining hall, Western Washington College, Bellingham, Wash.; general contracts to Elford Construction Co., Bellingham, $816,500, and Wick Construction Co., Seattle, $230,000.

200 tons, Washington State undercrossing, Pierce County; general contract to Ostruske-Murphy Inc., Tacoma, Wash., low at $227,086.

113 tons, state highway bridge, Allegheny County, Pennsylvania; bids Apr. 29.

100 tons plus, business administration building, University of Washington; James I. Barnes Construction Co., Seattle, awarded general contract $1,135,000.

100 tons or more, Coast Guard terminal, Seattle; Manson Construction & Engineering Co., Seattle, low at $158,330.

100 tons, including miscellaneous, 2 million gallon water reservoir, Renton, Wash.; general contract to G. R. Leischner Co., Seattle, at $103,594.

100 tons plus, addition to penitentiary hospital, Walla Walla, Wash.; Johnson, Busboom, Rauh, Spokane, Wash., low at $488,655.

75 tons, Washington State highway bridge, Snohomish County; general contract to Osberg Construction Co., Seattle, low at $78,712.

Unstated, Oregon State, Cottonwood bridge, Gilliam County; Mann Construction Co., Redmond, Oreg., low at $223,766; award pending until Apr. 21.

Advertising Index

Air Products, Inc. 34, 35
Ajax Magnethermic Corporation 81
Allen Manufacturing Co. 106
Aluminum Company of America 127
American Air Filter Co., Inc. 30
American Welding & Mfg. Co., The 42
Amplex Division, Chrysler Corporation 8, 9
Arcos Corporation 116, 117
Atlas Car & Mfg. Co. 10

B & H Instrument Co., Inc. 131
Baldwin-Lima-Hamilton, Standard Steel Works Division 31
Basic Products Corporation, Hevi-Duty Electric Co. Division 47
Berry Bearing Co. 151
Besly-Welles Corporation 101
Bethlehem Steel Co. 1
Birdsboro Corporation 24
Bliss & Laughlin 50, 51
Bliss, E. W., Co., Rolling Mill Division 3
Bullard Co., The 68

Carpenter Steel Co., The ..17, 18, 19, 20, 21, 22
Cattie, Joseph P., & Brothers, Inc. 144
Chambersburg Engineering Co. 121
Chicago Steel Service Co. 120
Chromium Mining and Smelting Corporation 151
Chrysler Corporation, Amplex Division 8, 9
Cleveland Tramrail Division, The Cleveland Crane & Engineering Co. 38
Clymer Associates, Inc. 145
Colorado Fuel & Iron Corporation, The 36, 37, 41
Cone-Drive Gears, Division Michigan Tool Co. 130
Copperweld Steel Co., Superior Steel Division 137
Cutler-Hammer, Inc. ..... Back Cover

Delta Power Tool Division, Rockwell Manufacturing Co. 130
Deming Co., The 144
Detrex Chemical Industries, Inc. 23
Detroit Steel Corporation 48
Diamond Power Specialty Corporation, Electronics Division 62
DoAll Co., The 138
Dravo Corporation 111

Eaton Manufacturing Co., Dynamatic Division 103
Eaton Manufacturing Co., Reliance Division 149
Electric Controller & Mfg. Division, Square D Co. ..... Inside Front Cover
Electronics Division of Diamond Power Specialty Corporation 62
Ex-Cell-O Corporation 6
Ex-Cell-O Corporation, Machinery Division .. 7

Fellows Gear Shaper Co., The 33

Hevi-Duty Electric Co., A Division of Basic Products Corporation 47
Hoover Ball & Bearing Co. 79
Hyde Park Foundry & Machine Co. 153

Inland Steel Co. 52, 95

Jomac, Inc. 118
Jones & Laughlin Steel Corporation 112, 113

Link-Belt Co. 25

McGill Manufacturing Co., Inc., Bearing Division 114

Metal & Thermit Corporation 86
Michigan Tool Co., Cone-Drive Gears Division 130
Midland-Ross Corporation, Surface Combustion Division 14, 15
Morgan Construction Co. 61

National Acme Co., The 26, 27

Olin Mathieson, Metals Division 84, 85
Osborn Manufacturing Co., The 128

Pangborn Corporation ..... Inside Back Cover
Pittsburgh Steel Co. 28, 29
Pope Machinery Corporation 115
Porter, H. K., Company, Inc., Refractories Division 98, 99
Pratt & Whitney Co., Inc. 108, 109
Production Experts, Inc. 151

Ransburg Electro-Coating Corporation 152
Reliance Division, Eaton Manufacturing Co. 149
Republic Steel Corporation 12, 13
Rockwell Manufacturing Co., Delta Power Tool Division 130
Roebling's, John A., Sons Division, The Colorado Fuel & Iron Corporation 41

Seaway Steel Corporation 122
SKF Industries, Inc. 2
Square D Co., Electric Controller & Mfg. Division ..... Inside Front Cover
Standard Steel Works Division, Baldwin-Lima-Hamilton 31
Steel Service Center Institute, Inc. 11
Superior Steel Division of Copperweld Steel Co. 137
Surface Combustion, A Division of Midland-Ross Corporation 14, 15

Tempil Corporation 72
Texaco, Inc. 119
Timmerman Products, Inc. 76
Torrington Co., The 147
Transue & Williams 67

Ulbrich Stainless Steels 129
Union Carbide Corporation, Union Carbide Metals Division 97
Union Carbide Metals Co., Division of Union Carbide Corporation 97

Van Huffel Tube Corporation 154
Veeder-Root 4
Vesuvius Crucible Co. 39

Ward Steel Co. 75
Washburn Wire Co. 32
Wean Equipment Corporation 71
Wheland Co., The 75

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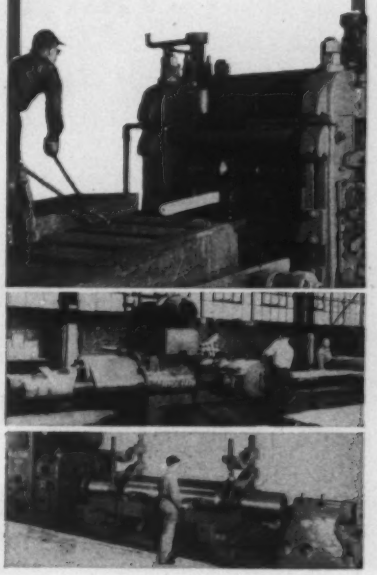
Table of Contents
Facing Inside Front Cover

Classified Advertising, Page 151

Hyde Park
ROLLING MILL EQUIPMENT



Hyde Park Engineers are always ready to co-operate with you in selecting and applying the rolling mill equipment best suited to your operation.

Bar Mills • Merchant Mills
Sheet and Strip Mills
Stretcher Levellers
Roller Tables • Pinion Stands
Sheet Mill Shears
Roll Lathes • Reduction Drives
Special Machinery • Machine Work

Hyde Park
FOUNDRY AND MACHINE CO.
HYDE PARK
Westmoreland County, Penna.

Rolls
Rolling Mill Equipment
Gray Iron Castings

Announcing

POWER STRUT DIVISION
VAN HUFFEL PRODUCTS, INC.
WARREN, OHIO

The Product lines of
POWER STRUT, INC.
DECOR PRODUCTS, INC.
Framingham, Mass.

have been acquired by

VAN HUFFEL PRODUCTS, INC.
A subsidiary of Van Huffel Tube Corporation, Warren, Ohio

Power Strut framing channels, fittings and accessories; Research and Industrial partitions, Decor movable walls, partitions and other products will be produced in Warren, Ohio by the Power Strut Division, Van Huffel Products, Inc.

The newly formed organization will continue to work with architects, engineers, mechanical and electrical contractors in the development of new uses where the basic idea of POWER STRUT CONTINUOUS SLOT FRAMING SYSTEM can play a distinct engineering and economic advantage.

VAN HUFFEL
TUBE CORPORATION, WARREN, OHIO

Where ideas take shape in metal

NOW ROTOBLAST STEEL SHOT PROVES IT CUTS ABRASIVE COSTS!

Rotoblast Steel Shot has already stacked up an impressive record of reduced costs in foundries* and blast cleaning departments* from coast to coast!

- Atlantic Coast steel foundry—Compared with premium abrasive formerly used, Rotoblast Steel Shot cuts abrasive costs *in half*—and gives better cleaning than before!
- Southwestern manufacturing company—Now uses 7 lbs. of Rotoblast Shot per wheel hour, compared to 23 lbs. of malleable shot previously used!
- Large automotive foundry—Rotoblast Shot consumption 30% less than other steel shot tested; cleans castings faster!
- Eastern steel plant—Now uses Rotoblast Shot to descale steel strip, after exacting lab tests proved it better than previous steel abrasives!
- Midwest forge shop—Found Rotoblast Shot reduced abrasive costs 23% below that of abrasives previously used!
- Steel tank company—Cut cleaning costs in half (from 4c to 2c per sq. ft.) when it switched to Rotoblast Steel Shot.

These examples are just some of the many proving Rotoblast's cost-cutting qualities! Arrange a trial in your plant! Talk to your Pangborn man or write PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Maryland. *Manufacturers of Blast Cleaning and Dust Control Equipment—Rotoblast Steel Shot and Grit.*

*Names available on request

Pangborn

ROTOBLAST®
STEEL SHOT & GRIT

Look what's behind Cutler-Hammer's new trademark

You can see the new power at Cutler-Hammer wherever you look. New products. New engineering depth, particularly in industrial automation. New plants and streamlined marketing methods, too. Even a new trademark to reflect this new vitality.

If you're planning ahead for the great growth of the sixties, come to the company that's ready to plan ahead with you. Look at just a few of the new products that are already improving efficiency in many fields:

NEW *computer system for establishing quality of tinplate coils*

NEW *limit switch that outlasts others by at least two times*

NEW *automated system for charging blast furnaces in steel mills*

NEW *stacker that counts and stacks newspapers automatically*

NEW *Safetybreaker line of service entrance equipment*

WHAT'S NEW? ASK...

CUTLER-HAMMER

CONTROL

Cutler-Hammer Inc., Milwaukee, Wis. • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.; Intercontinental Electronics Corporation.